

APPENDIX I

GLOSSARY

A

- ACCRETION**—Growth or increase in size by gradual addition.
- ADVECTION**—Horizontal transport of an atmospheric property solely by the motion of the atmosphere.
- AEROSOLS**—Small droplets of liquid suspended in a gas, such as water in the air.
- AFWA**—Air Force weather agency.
- AGL**—Above ground level. Measurements suffixed by the abbreviation AGL refer to height.
- ALIDADE**—A device frequently used by shipboard navigation personnel to sight objects and read either relative azimuth bearing or true azimuth bearing.
- AMBIENT**—A representative reading or measurement for a substance under surrounding conditions.
- ANALOG**—Proportional and continuous. An analog recorder draws continuous lines proportional to the electronic signal input. In an analog signal, the sound pitch varies proportionately with the intensity of the signal, and the signal is continuous.
- ANEMOMETER**—A device used to measure wind speed and/or wind direction. From the Greek word anemo, meaning wind, and modem word meter, meaning measurement device.
- ANEROID**—Without fluid or without water. An aneroid barometer uses no fluid (mercury).
- ANOMALOUS**—Irregular or abnormal.
- ANTICYCLONIC**—Any rotational motion in a clockwise manner in the Northern Hemisphere, or a counter-clockwise manner in the Southern Hemisphere.
- APPARENT**—The way something appears or is perceived, although it may not be true.
- ARQ**—Automatic response to query. A method of obtaining data by using AFMEDS or CMW.
- ASCENSION**—Rising or increasing in elevation.
- ASOS**—Automated surface observing system.
- AWSP**—Air weather service pamphlet, now AFP or Air Force pamphlet.
- AZIMUTH**—The horizontal angular measurement from a fixed reference to a point. The Navy uses angular measurements in clockwise degrees from 0 to 360. When 0 is referenced to true north, the result is a true azimuth bearing. When referenced to an arbitrary direction, such as the bow of a ship, the result is a relative azimuth bearing.

B

- BACKING**—A change in wind direction in a counterclockwise manner in the Northern Hemisphere, or a clockwise direction in the Southern Hemisphere.
- BATHYMETRY**—The features and depths underwater.
- BATHYTHERMOGRAPH**—Any device used to measure and record temperatures through a column of water.

C

- CALVE**—The process of splitting ice from a glacier to form icebergs.
- CCTV**—Closed circuit television.
- CEILOMETER**—A more sophisticated and automated clinometer used to measure cloud or ceiling heights.
- CIC**—Combat information center aboard ship.
- CLIMATIC**—Any element associated with the climate of an area.
- CLIMATOLOGY**—The study of the statistical means, frequencies, deviations, and trends of weather elements for an area over a period of time.
- CLINOMETER**—A device used to obtain an angular elevation measurement of a light spot on a cloud base to determine the cloud or ceiling height. The distance between the meter and the light source must be known.

CONDENSATION—The physical process by which a vapor becomes a liquid. This process releases heat energy.

CONDUCTION—Transmission of energy through a substance by direct molecular contact.

CONVECTION—Motions in a fluid, such as the atmosphere or water, which are predominantly vertical, resulting in a vertical transport of mass and eventually in a mixing of properties and energy.

CYCLONIC—Any rotational movement in a counterclockwise manner in the Northern Hemisphere, or a clockwise manner in the Southern Hemisphere.

D

DASI—Digital altimeter setting indicator (Navy).

DDN—Defense data network.

DIURNAL—Any change that follows a daily pattern, completing one cycle on a daily basis.

DMS—Position given in degrees, minutes, and seconds of latitude and longitude.

DRIBU—Drifting buoy.

DSN—Defense switched network, an upgrade and name change to the automatic voice network (AUTOVON).

E

ETAGE—The layers of the atmosphere by which the different genera of clouds are identified.

EVAPORATION—The change of state process by which a liquid or a solid is transformed into a gaseous state. This process requires the addition of heat to the substance.

F

FAA—Federal Aviation Administration.

FAX—Short form of facsimile, referring to weather facsimile or a telefacsimile transmission.

FLOES—Pieces of ice broken loose from a sheet of ice that originally formed in the sea (frozen sea water).

FNMOCC—Fleet Numerical Meteorology and Oceanography Center, Monterey, California.

FRONT—The interface or transition zone between two air masses of different density. Since temperature

is the most important regulator of atmospheric density, a front almost invariably separates air masses of different temperature.

FRONTAL SURFACE—Refers specifically to the warmer side of an air mass transition zone, and slopes in the vertical toward colder air.

FRONTAL SYSTEM—Simply a system of fronts as they appear on a surface analysis or prognosis chart.

FRONTOGENESIS—The formation of a front.

FRONTOLYSIS—The dissipation or weakening of a front.

G

GEOPHYSICS—Used to mean working with the physical properties of both the air, land, and water, this term is occasionally used to describe the occupational field of Navy and Marine Corps weather personnel.

GEOPOTENTIAL HEIGHT—The height of a given point in the atmosphere calculated with respect to the energy in the column of air beneath the point, relative to sea level. In other words, an approximation of the height based on measured temperatures, pressures, and humidity content of the supporting air column, and not necessarily an exact measured height.

GHSI—General heat stress index, similar to apparent temperature.

GMT—Greenwich mean time, a term replaced by Coordinated Universal Time (UTC).

GPM—Geopotential meters, also gallons per minute.

GUST—A brief, rapid increase in wind speed.

H

HECTOPASCAL (hPa)—A unit of 100 pascals used to measure pressure, exactly equivalent to 1 millibar.

HF—High frequency.

HIGH—An "area of high pressure," referring to a higher atmospheric pressure in the horizontal plane, such as a surface isobaric chart, or an "area of high heights," referring to higher heights in the vertical plane, such as on a constant pressure chart.

HYPOTHERMIA—An abnormally low body temperature.

I

ICAO—Abbreviation for International Civil Aviation Organization.

ICEBERG—Ice found floating in the sea that originated from glaciers formed from freshwater accumulations of snow.

IFR—Abbreviation for instrument flight rules.

INFRARED (IR)—The portion of the electromagnetic spectrum with wavelengths just slightly longer than visible light energy (heat energy).

INVERSION—With respect to temperature, an increase in temperature with height. Normally, temperature decreases with height in the atmosphere.

IRCS—International radio call sign.

ISOTHERMAL—Having an equal temperature throughout.

K

kn—Alternate abbreviation for knot. In meteorology, the more frequently used abbreviation is "kt," but this should not be confused with the uppercase "KT" meaning kiloton.

L

LAN—Local area network.

LAPSE RATE—The decrease of an atmospheric variable with height; the variable being temperature unless otherwise specified.

LCD—Liquid crystal display. A gray or black display of numbers or shapes commonly used in electronics.

LDATS—Lightning Detection and Tracking System.

LEWP—A radar feature, the line echo wave pattern, normally an indicator of severe weather.

LITTORAL—The coastal zone including the beach to the coastal waters.

LLWS—Low-level wind shear.

LOW—An "area of low pressure" in the horizontal plane referring to the isobars on a surface chart, or an "area of low heights," in the vertical plane referring to the height contours on a constant pressure chart.

M

MANOP—Formatted weather message header that identifies the product type, originator, and area covered by the product.

MET—U.S. Navy mobile environmental team.

METEM TECHNICIAN—A meteorological electronic equipment maintenance technician, a term usually referring to a Navy ET who has received special training on meteorological equipment in the METEM school.

METEOROLOGY—The study of phenomenon of the atmosphere.

METVANS—USMC mobile meteorological vans. Highly transportable, completely equipped meteorological facilities constructed as complete modules in cargo containers. Modules may be used independently or connected to form complete, full-spectrum, meteorological support facilities in a forward deployed environment.

MILS—An angular measurement scale in which 800 mils equals 45 degrees of arc; a circle is 6,400 mils.

MMF—U.S. Marine Corps mobile meteorological force (weather personnel who operate USMC Metvans).

MRC—Abbreviation for maintenance requirements card used with the 3-M System.

MRS—Mini rawinsonde system.

MSL—Mean sea level, a suffix used after altitude measurements.

MVFR—Marginal visual flight rules.

N

NATO—North Atlantic Treaty Organization.

NAVMETOCCOM—Short title for Naval Meteorology and Oceanography Command headquartered at the Stennis Space Center, Mississippi.

NBC—An acronym for nuclear, biological, or chemical.

NDASI—Navy digital altimeter setting indicator, also DASI.

NDB—Nondirectional beacon; a radio aircraft navigation aid that allows aircraft to determine the direction of the transmitter.

NIMA—National imagery and mapping agency.

NOAA—National Oceanic and Atmospheric Administration, a division of the U.S. Department of Commerce.

NODDES—Naval oceanographic data distribution expansion system (used with TESS).

NODDS—Navy oceanographic data distribution system.

NOMOGRAM—Any graphic product used to find solutions to complex calculations.

NOTAM—Notice to airmen.

NUC—An abbreviation for nuclear, used within some NATO messages.

NWS—National Weather Service, a division of NOAA.

O

OA—Abbreviation for shipboard aviation operations division, the shipboard division for which most Aerographer's Mates work.

OAML—Oceanographic and atmospheric master library.

OKTAS—Eighths of the sky.

OOD—Officer of the deck.

OPARS—Optimum path aircraft routing system.

P

PHEL—Physiological heat exposure limit.

PIBAL—An acronym for pilot balloon, a small balloon tracked with a theodolite to determine wind direction and speed.

PIREP—Abbreviation for pilot report.

PMSV—Pilot meteorological service, voice radio.

PREVAILING—The most frequent or most common.

PSYCHROMETER—Any device used to measure dry-bulb temperature (air temperature) and wet-bulb temperature.

Q

QFE—A signal used to indicate the value provided; the station pressure.

QFF—A signal used to indicate the value provided; the sea-level pressure.

QNH—A signal used to indicate the value provided; the minimum altimeter setting for the period of time discussed.

R

RABAL—A method using radar to track a balloon carrying a radar—reflector, and is used to determine upper—level winds.

RADAT—A term used to indicate freezing level information derived from a radiosonde observation.

RADFO—An acronym for radiological fallout.

RADIOSONDE—A device carried aloft by a balloon to measure pressure, temperature, and humidity in the atmosphere.

RAOB—Acronym for radiosonde observation.

RATT—Radio teletype.

RAWINSONDE—Radio--wind sounding. A device carried aloft by a balloon that measures pressure, temperature, humidity, and the slant—range from the release point. Calculations on the change in pressure (height) and change in slant—range (distance) yield wind speed and direction.

RBC—Rotating beam ceilometer.

RH—Usual abbreviation for relative humidity.

ROCKETSONDE—A device carried aloft by a rocket which measures pressure, temperature, and humidity as it drifts on a parachute to the ground.

ROCOB—Acronym for rocketsonde observation.

S

SALINITY—A measurement of the amount of salts dissolved in sea water.

SAR—Search and rescue.

SLUSH—A mixture of snow and liquid water on the ground.

SMOOS—Shipboard meteorological oceanographic observing system.

SSI—Showalter stability index.

SURFCAST—(or SURFCST) Acronym for surf forecast.

SUROB—Acronym for surf observation.

SYNOPTIC—In general, pertaining to or affording an overall view. In meteorology, this term has become specialized in referring to the use of meteorological

data obtained simultaneously over a wide area for presenting a comprehensive picture of the state of the atmosphere over a given period of time.

T

TACAN—Tactical air navigation, a radio aircraft navigation aid used originally by the military to provide a pilot with direction and distance to a TACAN transmitter.

TIC—Type, intensity, character code used to describe frontal systems.

TRANSMISSOMETER—Any device used to measure the transmission of light through a medium.

TROUGH—(Sometimes spelled TROF) An elongated area of low atmospheric pressure or heights extending outward from a low center; the opposite of a ridge. Also, the lowest portion of a wave cycle; the dip between the wave crests.

U

UHF—Ultra--high frequency radio transmission.

UNREP—Underway replenishment.

UPS—Universal polar stereographic grid system used by the military to locate positions in the polar regions.

UTC—Coordinated Universal Time, usually suffixed with a "Z."

UTM—Universal transverse mercator coordinates; a military coordinated system based on a series of grids used to locate positions between 84°N and 80°S.

V

VALID—Effective, good.

VEERING—A change in the wind direction in a clockwise manner in the Northern Hemisphere, or a counterclockwise manner in the Southern Hemisphere.

VELOCIMETER—In general, a device used to measure velocity (speed). In oceanography, the sound velocimeter measures the speed of sound in water.

VERTREP—Vertical replenishment by use of helicopters.

VLF—Very--low frequency.

W

WAN—Wide area network.

WBC—Weather broadcast center.

WBG—Wet--bulb globe temperature, a combined reading of air temperature, wet--bulb temperature, and a temperature inside a black--colored metal (high heat absorbing) ball.

WEATHER—The state of the atmosphere with respect to its effect upon life and human activities.

WEFAX—An acronym for weather facsimile, specifically the NWS service providing satellite imagery and graphic products via a geostationary satellite data broadcast.

WMO—World Meteorological Organization.

WPM—Words per minute.

X

XBT—Expendable bathythermograph, usually refers to the probe that is dropped in the water and not recovered.

XSV—Expendable sound velocimeter, usually refers to the probe that is dropped in the water and not recovered.

APPENDIX II

THE METRIC SYSTEM AND CONVERSION TABLES

**THESE PREFIXES MAY BE APPLIED
TO ALL SI UNITS**

| Multiples and Submultiples | Prefixes | Symbols |
|--|------------------------|----------------|
| 1 000 000 000 000 = 10^{12} | tera (těr 'à) | T |
| 1 000 000 000 = 10^9 | giga (ĵi 'gà) | G |
| 1 000 000 = 10^6 | mega (mėg 'à) | M* |
| 1 000 = 10^3 | kilo (kĭl 'ò) | k* |
| 100 = 10^2 | hecto (hėk 'tò) | h |
| 10 = 10^1 | deka (dėk 'à) | da |
| 0.1 = 10^{-1} | deci (dės 'ĭ) | d |
| 0.01 = 10^{-2} | centi (sėn 'tĭ) | c* |
| 0.001 = 10^{-3} | milli (mĭl 'ĭ) | m* |
| 0.000 001 = 10^{-6} | micro (mĭ 'krô) | μ* |
| 0.000 000 001 = 10^{-9} | nano (năn 'ô) | n |
| 0.000 000 000 001 = 10^{-12} | pico (pē 'kô) | p |
| 0.000 000 000 000 001 = 10^{-15} | femto (fēm 'tô) | f |
| 0.000 000 000 000 000 001 = 10^{-18} | atto (ăt 'tô) | a |

***Most commonly used**

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COMMON EQUIVALENTS

| LENGTH | VOLUME | MASS (WEIGHT) | ABBREVIATIONS |
|--|---|--|---|
| 1 in = 25.4 mm 1 in = 2.54 cm 1 ft = 30.48 cm 1 yd = 91.44 cm 1 mi = 5280. ft 1 mi = 1.609 km 1 mi = 0.868 nmi 1 mi = 1609.344 m 1 nmi = 6076.12 ft 1 nmi = 1.1508 mi 1 nmi = 1852 m 1 nmi = 1.853 km 1 mm = 0.039 in 1 cm = 0.394 in 1 cm = 0.033 ft 1 m = 39.37 in 1 m = 3.281 ft 1 km = 3280.84 ft 1 km = 0.6214 mi 1 km = 0.5400 nmi 1 fa = 6 ft | 1 in³ = 16.387 cc 1 ft³ = 1728 in³ 1 ft³ = 0.02832 m³ 1 ft³ = 7.48 gal 1 yd³ = 27 ft³ 1 cm³ = 1 ml 1 cm³ = 1 cc 1 m³ = 1,000 l 1 m³ = 100,000 ml 1 m³ = 35.315 ft³ 1 m³ = 264.17 gal 1 oz = 2 Tbs 1 oz = 6 tsp 1 pt = 16 oz 1 pt = 2 c 1 pt = 454 ml 1 qt = 2 pt 1 qt = 0.9464 l 1 gal = 4 qt 1 gal = 3.7854 l 1 gal = 0.8327 Igl 1 l = 1000 ml 1 l = 1 dm³ 1 l = 1.057 qt | 1 oz = 28.25 gm 1 lb = 453.6 gm 1 lb = 7000 gr 1 lb = 16 oz 1 lb = 0.4536 kg 1 st = 2000 lb 1 st = 907.2 kg 1 st = 0.9072 mt 1 st = 0.8929 lt 1 lt = 2240 lb 1 lt = 1.12 st 1 mt = 1000 kg 1 mt = 2204.6 lb 1 kg = 2.2046 lb sea water 1 ft³ = 64 lb pure water (4°C) 1 ft³ = 62.428 lb 1 ml = 1 gm 1 l = 1 kg 1 m³ = 1 mt | ac acre atm atmosphere c cup cc cubic centimeter cm centimeter dm decimeter fa fathom ft foot gal US gallon gm gram gr grain hPa hectoPascal Igl Imperial gallon in inch kg kilogram km kilometer kph kilometer/hour kt knot l liter lb pound lt long ton m meter mb millibar mi statute mile ml milliliter mm millimeter mph s. mile/hour mps meter/sec mt metric ton nmi nautical mile oz US ounce Pa Pascal pt US pint qt US quart st short ton T tablespoon tsp teaspoon yd yard |
| AREA | VELOCITY | FORCE (PRESSURE) | |
| 1 in² = 6.5 cm² 1 ft² = 144.0 in² 1 ft² = 0.09 m² 1 yd² = 9 ft² 1 yd² = 1296 in² 1 yd² = 0.8 m² 1 ac = 4840 yd² 1 ac = 43560 ft² 1 ac = 0.4 hectare 1 mi² = 27,878,400 ft² 1 mi² = 2,589,988 m² 1 cm² = 0.16 in² 1 m² = 10,000 cm² 1 m² = 10.76 ft² | 1 kt = 1.1507 mph 1 kt = 0.5144 mps 1 kt = 1.852 kmh 1 mph = 0.8690 kt 1 mph = 0.4470 mps 1 mph = 1.6093 kmh 1 mps = 3.6 kph 1 mps = 2.2369 mph 1 mps = 1.9438 kt 1 kph = 0.6214 mph 1 kph = 0.5399 kt | 1 hPa = 1 mb 1 hPa = 0.750 mmHg 1 hPa = 0.0295 inHg 1 hPa = 100 Pa 1 Pa = 1 Newton/m² 1 Pa = 100,000dyne/m² 1 mmHg = 1.333 hPa 1 mmHg = 0.0394 inHg 1 inHg = 33.864 hPa 1 inHg = 25.4 mmHg 1 atm = 1013.250 hPa 1 atm = 14.7 lb/in² 1 atm = 760 mmHg 1 atm = 29.921 inHg 1 atm = 33 ft sea water | |
| | | | |
| | | | |

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TEMPERATURE CONVERSION

FAHRENHEIT (F) TO CELSIUS (C) DEGREES

$$F = \frac{9}{5}C + 32 \quad \text{or} \quad F = 1.8C + 32$$

$$C = \frac{5}{9}(F - 32) \quad \text{or} \quad C = \frac{F - 32}{1.8}$$

| °F. | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| +120..... | +48.89 | +48.94 | +49.00 | +49.06 | +49.11 | +49.17 | +49.22 | +49.28 | +49.33 | +49.39 |
| 119..... | 48.33 | 48.39 | 48.44 | 48.50 | 48.56 | 48.61 | 48.67 | 48.72 | 48.78 | 48.83 |
| 118..... | 47.78 | 47.83 | 47.89 | 47.94 | 48.00 | 48.06 | 48.11 | 48.17 | 48.22 | 48.28 |
| 117..... | 47.22 | 47.28 | 47.33 | 47.39 | 47.44 | 47.50 | 47.56 | 47.61 | 47.67 | 47.72 |
| 116..... | 46.67 | 46.72 | 46.78 | 46.83 | 46.89 | 46.94 | 47.00 | 47.06 | 47.11 | 47.17 |
| | | | | | | | | | | |
| +115..... | +46.11 | +46.17 | +46.22 | +46.28 | +46.33 | +46.39 | +46.44 | +46.50 | +46.56 | +46.61 |
| 114..... | 45.56 | 45.61 | 45.67 | 45.72 | 45.78 | 45.83 | 45.89 | 45.94 | 46.00 | 46.06 |
| 113..... | 45.00 | 45.06 | 45.11 | 45.17 | 45.22 | 45.28 | 45.33 | 45.39 | 45.44 | 45.50 |
| 112..... | 44.44 | 44.50 | 44.56 | 44.61 | 44.67 | 44.72 | 44.78 | 44.83 | 44.89 | 44.94 |
| 111..... | 43.89 | 43.94 | 44.00 | 44.06 | 44.11 | 44.17 | 44.22 | 44.28 | 44.33 | 44.39 |
| | | | | | | | | | | |
| +110..... | +43.33 | +43.39 | +43.44 | +43.50 | +43.56 | +43.61 | +43.67 | +43.72 | +43.78 | +43.83 |
| 109..... | 42.78 | 42.83 | 42.89 | 42.94 | 43.00 | 43.06 | 43.11 | 43.17 | 43.22 | 43.28 |
| 108..... | 42.22 | 42.28 | 42.33 | 42.39 | 42.44 | 42.50 | 42.56 | 42.61 | 42.67 | 42.72 |
| 107..... | 41.67 | 41.72 | 41.78 | 41.83 | 41.89 | 41.94 | 42.00 | 42.06 | 42.11 | 42.17 |
| 106..... | 41.11 | 41.17 | 41.22 | 41.28 | 41.33 | 41.39 | 41.44 | 41.50 | 41.56 | 41.61 |
| | | | | | | | | | | |
| +105..... | +40.56 | +40.61 | +40.67 | +40.72 | +40.78 | +40.83 | +40.89 | +40.94 | +41.00 | +41.06 |
| 104..... | 40.00 | 40.06 | 40.11 | 40.17 | 40.22 | 40.28 | 40.33 | 40.39 | 40.44 | 40.50 |
| 103..... | 39.44 | 39.50 | 39.56 | 39.61 | 39.67 | 39.72 | 39.78 | 39.83 | 39.89 | 39.94 |
| 102..... | 38.89 | 38.94 | 39.00 | 39.06 | 39.11 | 39.17 | 39.22 | 39.28 | 39.33 | 39.39 |
| 101..... | 38.33 | 38.39 | 38.44 | 38.50 | 38.56 | 38.61 | 38.67 | 38.72 | 38.78 | 38.83 |
| | | | | | | | | | | |
| +100..... | +37.78 | +37.83 | +37.89 | +37.94 | +38.00 | +38.06 | +38.11 | +38.17 | +38.22 | +38.28 |
| 99..... | 37.22 | 37.28 | 37.33 | 37.39 | 37.44 | 37.50 | 37.56 | 37.61 | 37.67 | 37.72 |
| 98..... | 36.67 | 36.72 | 36.78 | 36.83 | 36.89 | 36.94 | 37.00 | 37.06 | 37.11 | 37.17 |
| 97..... | 36.11 | 36.17 | 36.22 | 36.28 | 36.33 | 36.39 | 36.44 | 36.50 | 36.56 | 36.61 |
| 96..... | 35.56 | 35.61 | 35.67 | 35.72 | 35.78 | 35.83 | 35.89 | 35.94 | 36.00 | 36.06 |
| | | | | | | | | | | |
| +95..... | +35.00 | +35.06 | +35.11 | +35.17 | +35.22 | +35.28 | +35.33 | +35.39 | +35.44 | +35.50 |
| 94..... | 34.44 | 34.50 | 34.56 | 34.61 | 34.67 | 34.72 | 34.78 | 34.83 | 34.89 | 34.94 |
| 93..... | 33.89 | 33.94 | 34.00 | 34.06 | 34.11 | 34.17 | 34.22 | 34.28 | 34.33 | 34.39 |
| 92..... | 33.33 | 33.39 | 33.44 | 33.50 | 33.56 | 33.61 | 33.67 | 33.72 | 33.78 | 33.83 |
| 91..... | 32.78 | 32.83 | 32.89 | 32.94 | 33.00 | 33.06 | 33.11 | 33.17 | 33.22 | 33.28 |
| | | | | | | | | | | |
| +90..... | +32.22 | +32.28 | +32.33 | +32.39 | +32.44 | +32.50 | +32.56 | +32.61 | +32.67 | +32.72 |
| 89..... | 31.67 | 31.72 | 31.78 | 31.83 | 31.89 | 31.94 | 32.00 | 32.06 | 32.11 | 32.17 |
| 88..... | 31.11 | 31.17 | 31.22 | 31.28 | 31.33 | 31.39 | 31.44 | 31.50 | 31.56 | 31.61 |
| 87..... | 30.56 | 30.61 | 30.67 | 30.72 | 30.78 | 30.83 | 30.89 | 30.94 | 31.00 | 31.06 |
| 86..... | 30.00 | 30.06 | 30.11 | 30.17 | 30.22 | 30.28 | 30.33 | 30.39 | 30.44 | 30.50 |
| | | | | | | | | | | |
| +85..... | +29.44 | +29.50 | +29.56 | +29.61 | +29.67 | +29.72 | +29.78 | +29.83 | +29.89 | +29.94 |
| 84..... | 28.89 | 28.94 | 29.00 | 29.06 | 29.11 | 29.17 | 29.22 | 29.28 | 29.33 | 29.39 |
| 83..... | 28.33 | 28.39 | 28.44 | 28.50 | 28.56 | 28.61 | 28.67 | 28.72 | 28.78 | 28.83 |
| 82..... | 27.78 | 27.83 | 27.89 | 27.94 | 28.00 | 28.06 | 28.11 | 28.17 | 28.22 | 28.28 |
| 81..... | 27.22 | 27.28 | 27.33 | 27.39 | 27.44 | 27.50 | 27.56 | 27.61 | 27.67 | 27.72 |
| | | | | | | | | | | |
| +80..... | +26.67 | +26.72 | +26.78 | +26.83 | +26.89 | +26.94 | +27.00 | +27.06 | +27.11 | +27.17 |
| 79..... | 26.11 | 26.17 | 26.22 | 26.28 | 26.33 | 26.39 | 26.44 | 26.50 | 26.56 | 26.61 |
| 78..... | 25.56 | 25.61 | 25.67 | 25.72 | 25.78 | 25.83 | 25.89 | 25.94 | 26.00 | 26.06 |
| 77..... | 25.00 | 25.06 | 25.11 | 25.17 | 25.22 | 25.28 | 25.33 | 25.39 | 25.44 | 25.50 |
| 76..... | 24.44 | 24.50 | 24.56 | 24.61 | 24.67 | 24.72 | 24.78 | 24.83 | 24.89 | 24.94 |

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| Reportable Visibility Values | | | | | |
|--|-------|--------|-----|-------|--------|
| NM | SM | METERS | NM | SM | METERS |
| 0.0 | 0 | 0000 | 1.4 | 1-5/8 | 2600 |
| 0.05 | 1/16 | 0100 | 1.5 | 1-3/4 | 2800 |
| 0.1 | 1/8 | 0200 | 1.6 | 1-7/8 | 3000 |
| 0.15 | 3/16 | 0300 | 1.7 | 2 | 3200 |
| 0.2 | 1/4 | 0400 | 1.8 | --- | 3400 |
| 0.25 | 5/16 | 0500 | 1.9 | 2-1/4 | 3600 |
| 0.3 | 3/8 | 0600 | 2.0 | --- | 3700 |
| 0.4 | --- | 0700 | 2.2 | 2-1/2 | 4000 |
| 0.45 | 1/2 | 0800 | --- | 2-3/4 | 4400 |
| 0.5 | --- | 0900 | 2.4 | --- | 4500 |
| 0.55 | 5/8 | 1000 | 2.5 | --- | 4700 |
| 0.6 | --- | 1100 | 2.6 | 3 | 4800 |
| --- | 3/4 | 1200 | 2.7 | --- | 5000 |
| 0.7 | --- | 1300 | 3.0 | 4 | 6000 |
| --- | 7/8 | 1400 | 4.0 | --- | 7000 |
| 0.8 | --- | 1500 | 4.3 | 5 | 8000 |
| --- | 1 | 1600 | 5.0 | 6 | 9000 |
| 0.9 | --- | 1700 | 6.0 | 7 | 9999 |
| 1.0 | 1-1/8 | 1800 | 7.0 | 8 | 9999 |
| 1.1 | 1-1/4 | 2000 | 8.0 | 9 | 9999 |
| 1.2 | 1-3/8 | 2200 | 9.0 | 10 | 9999 |
| 1.3 | 1-1/2 | 2400 | | | |
| 1 statute mile = 5280 feet = 0.868976 nautical mile = 1.609344 kilometers 1 kilometer = 3281 feet = 0.6215 statute mile = 0.53946 nautical mile | | | | | |

AGM10139

HEIGHT CONVERSION FEET TO METERS CONTINUED

| Feet | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 15000..... | 4572 | 4602 | 4633 | 4663 | 4694 | 4724 | 4755 | 4785 | 4816 | 4846 |
| 16000..... | 4877 | 4907 | 4938 | 4968 | 4999 | 5029 | 5060 | 5090 | 5121 | 5151 |
| 17000..... | 5182 | 5212 | 5243 | 5273 | 5304 | 5334 | 5364 | 5395 | 5426 | 5456 |
| 18000..... | 5486 | 5517 | 5547 | 5578 | 5608 | 5639 | 5669 | 5700 | 5730 | 5761 |
| 19000..... | 5791 | 5822 | 5852 | 5883 | 5913 | 5944 | 5974 | 6005 | 6036 | 6066 |
| 20000..... | 6096 | 6126 | 6157 | 6187 | 6218 | 6248 | 6279 | 6309 | 6340 | 6370 |
| 21000..... | 6401 | 6431 | 6462 | 6492 | 6523 | 6553 | 6584 | 6614 | 6645 | 6675 |
| 22000..... | 6706 | 6736 | 6767 | 6797 | 6828 | 6858 | 6888 | 6919 | 6949 | 6980 |
| 23000..... | 7010 | 7041 | 7071 | 7102 | 7132 | 7163 | 7193 | 7224 | 7254 | 7285 |
| 24000..... | 7315 | 7346 | 7376 | 7407 | 7437 | 7468 | 7498 | 7529 | 7559 | 7590 |
| 25000..... | 7620 | 7650 | 7681 | 7711 | 7742 | 7772 | 7803 | 7833 | 7864 | 7894 |
| 26000..... | 7925 | 7955 | 7986 | 8016 | 8047 | 8077 | 8108 | 8138 | 8169 | 8199 |
| 27000..... | 8230 | 8260 | 8291 | 8321 | 8352 | 8382 | 8412 | 8443 | 8473 | 8504 |
| 28000..... | 8534 | 8565 | 8595 | 8626 | 8656 | 8687 | 8717 | 8748 | 8778 | 8809 |
| 29000..... | 8839 | 8870 | 8900 | 8931 | 8961 | 8992 | 9022 | 9053 | 9083 | 9114 |
| 30000..... | 9144 | 9174 | 9205 | 9235 | 9266 | 9296 | 9327 | 9357 | 9388 | 9418 |
| 31000..... | 9449 | 9479 | 9510 | 9540 | 9571 | 9601 | 9632 | 9662 | 9693 | 9723 |
| 32000..... | 9754 | 9784 | 9815 | 9845 | 9876 | 9906 | 9936 | 9967 | 9997 | 10028 |
| 33000..... | 10058 | 10089 | 10119 | 10150 | 10180 | 10211 | 10241 | 10272 | 10302 | 10333 |
| 34000..... | 10363 | 10394 | 10424 | 10455 | 10485 | 10516 | 10546 | 10577 | 10607 | 10638 |
| 35000..... | 10668 | 10699 | 10729 | 10759 | 10790 | 10820 | 10851 | 10881 | 10912 | 10942 |
| 36000..... | 10973 | 11003 | 11034 | 11064 | 11095 | 11125 | 11156 | 11186 | 11217 | 11247 |
| 37000..... | 11278 | 11308 | 11339 | 11369 | 11400 | 11430 | 11461 | 11491 | 11521 | 11552 |
| 38000..... | 11582 | 11613 | 11643 | 11674 | 11704 | 11735 | 11765 | 11796 | 11826 | 11857 |
| 39000..... | 11887 | 11918 | 11948 | 11979 | 12009 | 12040 | 12070 | 12101 | 12131 | 12162 |
| 40000..... | 12192 | 12223 | 12253 | 12283 | 12314 | 12344 | 12375 | 12405 | 12436 | 12466 |

AGM10140

TEMPERATURE CONVERSION
FAHRENHEIT (F) TO CELSIUS (C) DEGREES
 CONTINUED

| °F | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| -35..... | -37.22 | -37.28 | -37.33 | -37.39 | -37.44 | -37.50 | -37.56 | -37.61 | -37.67 | -37.72 |
| 36..... | 37.78 | 37.83 | 37.89 | 37.94 | 38.00 | 38.06 | 38.11 | 38.17 | 38.22 | 38.28 |
| 37..... | 38.33 | 38.39 | 38.44 | 38.50 | 38.56 | 38.61 | 38.67 | 38.72 | 38.78 | 38.83 |
| 38..... | 38.89 | 38.94 | 39.00 | 39.06 | 39.11 | 39.17 | 39.22 | 39.28 | 39.33 | 39.39 |
| 39..... | 39.44 | 39.50 | 39.56 | 39.61 | 39.67 | 39.72 | 39.78 | 39.83 | 39.89 | 39.94 |

PRECIPITATION AMOUNT CONVERSION
INCHES TO CENTIMETERS

1 inch = 2.54 centimeters
 1 centimeters = 0.3937 inch

| Inch | Centimeter | Inch | Centimeter | Inch | Centimeter | Inch | Centimeter |
|------|------------|------|------------|------|------------|------|------------|
| 0 | 0 | 0.26 | 0.66 | 0.52 | 1.32 | 0.78 | 1.98 |
| 0.01 | 0.03 | 0.27 | 0.69 | 0.53 | 1.35 | 0.79 | 2.01 |
| 0.02 | 0.05 | 0.28 | 0.71 | 0.54 | 1.37 | 0.80 | 2.03 |
| 0.03 | 0.08 | 0.29 | 0.74 | 0.55 | 1.40 | 0.81 | 2.06 |
| 0.04 | 0.10 | 0.30 | 0.76 | 0.56 | 1.42 | 0.82 | 2.08 |
| 0.05 | 0.13 | 0.31 | 0.79 | 0.57 | 1.45 | 0.83 | 2.11 |
| 0.06 | 0.15 | 0.32 | 0.81 | 0.58 | 1.47 | 0.84 | 2.13 |
| 0.07 | 0.18 | 0.33 | 0.84 | 0.59 | 1.50 | 0.85 | 2.16 |
| 0.08 | 0.20 | 0.34 | 0.87 | 0.60 | 1.52 | 0.86 | 2.18 |
| 0.09 | 0.23 | 0.35 | 0.89 | 0.61 | 1.55 | 0.87 | 2.21 |
| 0.10 | 0.25 | 0.36 | 0.91 | 0.62 | 1.57 | 0.88 | 2.24 |
| 0.11 | 0.28 | 0.37 | 0.94 | 0.63 | 1.60 | 0.89 | 2.26 |
| 0.12 | 0.30 | 0.38 | 0.97 | 0.64 | 1.63 | 0.90 | 2.29 |
| 0.13 | 0.33 | 0.39 | 0.99 | 0.65 | 1.65 | 0.91 | 2.31 |
| 0.14 | 0.36 | 0.40 | 1.02 | 0.66 | 1.68 | 0.92 | 2.34 |
| 0.15 | 0.38 | 0.41 | 1.04 | 0.67 | 1.70 | 0.93 | 2.36 |
| 0.16 | 0.41 | 0.42 | 1.07 | 0.68 | 1.73 | 0.94 | 2.39 |
| 0.17 | 0.43 | 0.43 | 1.09 | 0.69 | 1.75 | 0.95 | 2.41 |
| 0.18 | 0.46 | 0.44 | 1.12 | 0.70 | 1.78 | 0.96 | 2.44 |
| 0.19 | 0.48 | 0.45 | 1.14 | 0.71 | 1.80 | 0.97 | 2.46 |
| 0.20 | 0.51 | 0.46 | 1.17 | 0.72 | 1.83 | 0.98 | 2.49 |
| 0.21 | 0.53 | 0.47 | 1.19 | 0.73 | 1.85 | 0.99 | 2.51 |
| 0.22 | 0.56 | 0.48 | 1.22 | 0.74 | 1.88 | 1.00 | 2.54 |
| 0.23 | 0.58 | 0.49 | 1.24 | 0.75 | 1.91 | | |
| 0.24 | 0.61 | 0.50 | 1.27 | 0.76 | 1.93 | | |
| 0.25 | 0.64 | 0.51 | 1.30 | 0.77 | 1.96 | | |

AGM10141

| AZIMUTH MEASUREMENTS - DEGREES TO MILS | | | | | | | |
|--|------|-----|------|-----|------|-----|------|
| deg | Mils | deg | Mils | deg | Mils | deg | Mils |
| 0 | 0 | 90 | 1600 | 180 | 3200 | 270 | 4800 |
| 5 | 89 | 95 | 1689 | 185 | 3289 | 275 | 4889 |
| 10 | 178 | 100 | 1778 | 190 | 3378 | 280 | 4978 |
| 15 | 267 | 105 | 1867 | 195 | 3467 | 285 | 5067 |
| 20 | 356 | 110 | 1956 | 200 | 3556 | 290 | 5156 |
| 25 | 445 | 115 | 2045 | 205 | 3645 | 295 | 5245 |
| 30 | 533 | 120 | 2133 | 210 | 3733 | 300 | 5333 |
| 35 | 622 | 125 | 2222 | 215 | 3822 | 305 | 5422 |
| 40 | 711 | 130 | 2311 | 220 | 3911 | 310 | 5511 |
| 45 | 800 | 135 | 2400 | 225 | 4000 | 315 | 5600 |
| 50 | 889 | 140 | 2489 | 230 | 4089 | 320 | 5689 |
| 55 | 978 | 145 | 2578 | 235 | 4178 | 325 | 5778 |
| 60 | 1067 | 150 | 2667 | 240 | 4267 | 330 | 5867 |
| 65 | 1156 | 155 | 2756 | 245 | 4356 | 335 | 5956 |
| 70 | 1245 | 160 | 2845 | 250 | 4445 | 340 | 6045 |
| 75 | 1333 | 165 | 2933 | 255 | 4533 | 345 | 6133 |
| 80 | 1422 | 170 | 3022 | 260 | 4622 | 350 | 6222 |
| 85 | 1511 | 175 | 3111 | 265 | 4711 | 355 | 6311 |
| 90 | 1600 | 180 | 3200 | 270 | 4800 | 360 | 6400 |

AGM10142

TEMPERATURE CONVERSION
FAHRENHEIT (F) TO CELSIUS (C) DEGREES
CONTINUED

| °F | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| +75..... | +23.89 | +23.94 | +24.00 | +24.06 | +24.11 | +24.17 | +24.22 | +24.28 | +24.33 | +24.39 |
| 74..... | 23.33 | 23.39 | 23.44 | 23.50 | 23.56 | 23.61 | 23.67 | 23.72 | 23.78 | 23.83 |
| 73..... | 22.78 | 22.83 | 22.89 | 22.94 | 23.00 | 23.06 | 23.11 | 23.17 | 23.22 | 23.28 |
| 72..... | 22.22 | 22.28 | 22.33 | 22.39 | 22.44 | 22.50 | 22.56 | 22.61 | 22.67 | 22.72 |
| 71..... | 21.67 | 21.72 | 21.78 | 21.83 | 21.89 | 21.94 | 22.00 | 22.06 | 22.11 | 22.17 |
| | | | | | | | | | | |
| +70..... | +21.11 | +21.17 | +21.22 | +21.28 | +21.33 | +21.39 | +21.44 | +21.50 | +21.56 | +21.61 |
| 69..... | 20.56 | 20.61 | 20.67 | 20.72 | 20.78 | 20.83 | 20.89 | 20.94 | 21.00 | 21.06 |
| 68..... | 20.00 | 20.06 | 20.11 | 20.17 | 20.22 | 20.28 | 20.33 | 20.39 | 20.44 | 20.50 |
| 67..... | 19.44 | 19.50 | 19.56 | 19.61 | 19.67 | 19.72 | 19.78 | 19.83 | 19.89 | 19.94 |
| 66..... | 18.89 | 18.94 | 19.00 | 19.06 | 19.11 | 19.17 | 19.22 | 19.28 | 19.33 | 19.39 |
| | | | | | | | | | | |
| +65..... | +18.33 | +18.39 | +18.44 | +18.50 | +18.56 | +18.61 | +18.67 | +18.72 | +18.78 | +18.83 |
| 64..... | 17.78 | 17.83 | 17.89 | 17.94 | 18.00 | 18.06 | 18.11 | 18.17 | 18.22 | 18.28 |
| 63..... | 17.22 | 17.28 | 17.33 | 17.39 | 17.44 | 17.50 | 17.56 | 17.61 | 17.67 | 17.72 |
| 62..... | 16.67 | 16.72 | 16.78 | 16.83 | 16.89 | 16.94 | 17.00 | 17.06 | 17.11 | 17.17 |
| 61..... | 16.11 | 16.17 | 16.22 | 16.28 | 16.33 | 16.39 | 16.44 | 16.50 | 16.56 | 16.61 |
| | | | | | | | | | | |
| +60..... | +15.56 | +15.61 | +15.67 | +15.72 | +15.78 | +15.83 | +15.89 | +15.94 | +16.00 | +16.06 |
| 59..... | 15.00 | 15.06 | 15.11 | 15.17 | 15.22 | 15.28 | 15.33 | 15.39 | 15.44 | 15.50 |
| 58..... | 14.44 | 14.50 | 14.56 | 14.61 | 14.67 | 14.72 | 14.78 | 14.83 | 14.89 | 14.94 |
| 57..... | 13.89 | 13.94 | 14.00 | 14.06 | 14.11 | 14.17 | 14.22 | 14.28 | 14.33 | 14.39 |
| 56..... | 13.33 | 13.39 | 13.44 | 13.50 | 13.56 | 13.61 | 13.67 | 13.72 | 13.78 | 13.83 |
| | | | | | | | | | | |
| +55..... | +12.78 | +12.83 | +12.89 | +12.94 | +13.00 | +13.06 | +13.11 | +13.17 | +13.22 | +13.28 |
| 54..... | 12.22 | 12.28 | 12.33 | 12.39 | 12.44 | 12.50 | 12.56 | 12.61 | 12.67 | 12.72 |
| 53..... | 11.67 | 11.72 | 11.78 | 11.83 | 11.89 | 11.94 | 12.00 | 12.06 | 12.11 | 12.17 |
| 52..... | 11.11 | 11.17 | 11.22 | 11.28 | 11.33 | 11.39 | 11.44 | 11.50 | 11.56 | 11.61 |
| 51..... | 10.56 | 10.61 | 10.67 | 10.72 | 10.78 | 10.83 | 10.89 | 10.94 | 11.00 | 11.06 |
| | | | | | | | | | | |
| +50..... | +10.00 | +10.06 | +10.11 | +10.17 | +10.22 | +10.28 | +10.33 | +10.39 | +10.44 | +10.50 |
| 49..... | 9.44 | 9.50 | 9.56 | 9.61 | 9.67 | 9.72 | 9.78 | 9.83 | 9.89 | 9.94 |
| 48..... | 8.89 | 8.94 | 9.00 | 9.06 | 9.11 | 9.17 | 9.22 | 9.28 | 9.33 | 9.39 |
| 47..... | 8.33 | 8.39 | 8.44 | 8.50 | 8.56 | 8.61 | 8.67 | 8.72 | 8.78 | 8.83 |
| 46..... | 7.78 | 7.83 | 7.89 | 7.94 | 8.00 | 8.06 | 8.11 | 8.17 | 8.22 | 8.28 |
| | | | | | | | | | | |
| +45..... | +7.22 | +7.28 | +7.33 | +7.39 | +7.44 | +7.50 | +7.56 | +7.61 | +7.67 | +7.72 |
| 44..... | 6.67 | 6.72 | 6.78 | 6.83 | 6.89 | 6.94 | 7.00 | 7.06 | 7.11 | 7.17 |
| 43..... | 6.11 | 6.17 | 6.22 | 6.28 | 6.33 | 6.39 | 6.44 | 6.50 | 6.56 | 6.61 |
| 42..... | 5.56 | 5.61 | 5.67 | 5.72 | 5.78 | 5.83 | 5.89 | 5.94 | 6.00 | 6.06 |
| 41..... | 5.00 | 5.06 | 5.11 | 5.17 | 5.22 | 5.28 | 5.33 | 5.39 | 5.44 | 5.50 |
| | | | | | | | | | | |
| +40..... | +4.44 | +4.50 | +4.56 | +4.61 | +4.67 | +4.72 | +4.78 | +4.83 | +4.89 | +4.94 |
| 39..... | 3.89 | 3.94 | 4.00 | 4.06 | 4.11 | 4.17 | 4.22 | 4.28 | 4.33 | 4.39 |
| 38..... | 3.33 | 3.39 | 3.44 | 3.50 | 3.56 | 3.61 | 3.67 | 3.72 | 3.78 | 3.83 |
| 37..... | 2.78 | 2.83 | 2.89 | 2.94 | 3.00 | 3.06 | 3.11 | 3.17 | 3.22 | 3.28 |
| 36..... | 2.22 | 2.28 | 2.33 | 2.39 | 2.44 | 2.50 | 2.56 | 2.61 | 2.67 | 2.72 |
| | | | | | | | | | | |
| +35..... | +1.67 | +1.72 | +1.78 | +1.83 | +1.89 | +1.94 | +2.00 | +2.06 | +2.11 | +2.17 |
| 34..... | +1.11 | +1.17 | +1.22 | +1.28 | +1.33 | +1.39 | +1.44 | +1.50 | +1.56 | +1.61 |
| 33..... | +.56 | +.61 | +.67 | +.72 | +.78 | +.83 | +.89 | +.94 | +1.00 | +1.06 |
| 32..... | .00 | +.06 | +.11 | +.17 | +.22 | +.28 | +.33 | +.39 | +.44 | +.50 |
| 31..... | -.56 | -.50 | -.44 | -.39 | -.33 | -.28 | -.22 | -.17 | -.11 | -.06 |
| | | | | | | | | | | |
| +30..... | -1.11 | -1.06 | -1.00 | -.94 | -.89 | -.83 | -.78 | -.72 | -.67 | -.61 |
| 29..... | 1.67 | 1.61 | 1.56 | 1.50 | 1.44 | 1.39 | 1.33 | 1.28 | 1.22 | 1.17 |
| 28..... | 2.22 | 2.17 | 2.11 | 2.06 | 2.00 | 1.94 | 1.89 | 1.83 | 1.78 | 1.72 |
| 27..... | 2.78 | 2.72 | 2.67 | 2.61 | 2.56 | 2.50 | 2.44 | 2.39 | 2.33 | 2.28 |
| 26..... | 3.33 | 3.28 | 3.22 | 3.17 | 3.11 | 3.06 | 3.00 | 2.94 | 2.89 | 2.83 |
| | | | | | | | | | | |
| +25..... | -3.89 | -3.83 | -3.78 | -3.72 | -3.67 | -3.61 | -3.56 | -3.50 | -3.44 | -3.39 |
| 24..... | 4.44 | 4.39 | 4.33 | 4.28 | 4.22 | 4.17 | 4.11 | 4.06 | 4.00 | 3.94 |
| 23..... | 5.00 | 4.94 | 4.89 | 4.83 | 4.78 | 4.72 | 4.67 | 4.61 | 4.56 | 4.50 |
| 22..... | 5.56 | 5.50 | 5.44 | 5.39 | 5.33 | 5.28 | 5.22 | 5.17 | 5.11 | 5.06 |
| 21..... | 6.11 | 6.06 | 6.00 | 5.94 | 5.89 | 5.83 | 5.78 | 5.72 | 5.67 | 5.61 |

AGM10143

TEMPERATURE CONVERSION
FAHRENHEIT (F) TO CELSIUS (C) DEGREES
CONTINUED

| °F | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| +20..... | -6.67 | -6.61 | -6.56 | -6.50 | -6.44 | -6.39 | -6.33 | -6.28 | -6.22 | -6.17 |
| 19..... | 7.22 | 7.17 | 7.11 | 7.06 | 7.00 | 6.94 | 6.89 | 6.83 | 6.78 | 6.72 |
| 18..... | 7.78 | 7.72 | 7.67 | 7.61 | 7.56 | 7.50 | 7.44 | 7.39 | 7.33 | 7.28 |
| 17..... | 8.33 | 8.28 | 8.22 | 8.17 | 8.11 | 8.06 | 8.00 | 7.94 | 7.89 | 7.83 |
| 16..... | 8.89 | 8.83 | 8.78 | 8.72 | 8.67 | 8.61 | 8.56 | 8.50 | 8.44 | 8.39 |
| +15..... | -9.44 | -9.39 | -9.33 | -9.28 | -9.22 | -9.17 | -9.11 | -9.06 | -9.00 | -8.94 |
| 14..... | 10.00 | 9.94 | 9.89 | 9.83 | 9.78 | 9.72 | 9.67 | 9.61 | 9.56 | 9.50 |
| 13..... | 10.56 | 10.50 | 10.44 | 10.39 | 10.33 | 10.28 | 10.22 | 10.17 | 10.11 | 10.06 |
| 12..... | 11.11 | 11.06 | 11.00 | 10.94 | 10.89 | 10.83 | 10.78 | 10.72 | 10.67 | 10.61 |
| 11..... | 11.67 | 11.61 | 11.56 | 11.50 | 11.44 | 11.39 | 11.33 | 11.28 | 11.22 | 11.17 |
| +10..... | -12.22 | -12.17 | -12.11 | -12.06 | -12.00 | -11.94 | -11.89 | -11.83 | -11.78 | -11.72 |
| 9..... | 12.78 | 12.72 | 12.67 | 12.61 | 12.56 | 12.50 | 12.44 | 12.39 | 12.33 | 12.28 |
| 8..... | 13.33 | 13.28 | 13.22 | 13.17 | 13.11 | 13.06 | 13.00 | 12.94 | 12.89 | 12.83 |
| 7..... | 13.89 | 13.83 | 13.78 | 13.72 | 13.67 | 13.61 | 13.56 | 13.50 | 13.44 | 13.39 |
| 6..... | 14.44 | 14.39 | 14.33 | 14.28 | 14.22 | 14.17 | 14.11 | 14.06 | 14.00 | 13.94 |
| +5..... | -15.00 | -14.94 | -14.89 | -14.83 | -14.78 | -14.72 | -14.67 | -14.61 | -14.56 | -14.50 |
| 4..... | 15.56 | 15.50 | 15.44 | 15.39 | 15.33 | 15.28 | 15.22 | 15.17 | 15.11 | 15.06 |
| 3..... | 16.11 | 16.06 | 16.00 | 15.94 | 15.89 | 15.83 | 15.78 | 15.72 | 15.67 | 15.61 |
| 2..... | 16.67 | 16.61 | 16.56 | 16.50 | 16.44 | 16.39 | 16.33 | 16.28 | 16.22 | 16.17 |
| 1..... | 17.22 | 17.17 | 17.11 | 17.06 | 17.00 | 16.94 | 16.89 | 16.83 | 16.78 | 16.72 |
| +0..... | 17.78 | 17.72 | 17.67 | 17.61 | 17.56 | 17.50 | 17.44 | 17.39 | 17.33 | 17.28 |
| -0..... | -17.78 | -17.83 | -17.89 | -17.94 | -18.00 | -18.06 | -18.11 | -18.17 | -18.22 | -18.28 |
| 1..... | 18.33 | 18.39 | 18.44 | 18.50 | 18.56 | 18.61 | 18.67 | 18.72 | 18.78 | 18.83 |
| 2..... | 18.89 | 18.94 | 19.00 | 19.06 | 19.11 | 19.17 | 19.22 | 19.28 | 19.33 | 19.39 |
| 3..... | 19.44 | 19.50 | 19.56 | 19.61 | 19.67 | 19.72 | 19.78 | 19.83 | 19.89 | 19.94 |
| 4..... | 20.00 | 20.06 | 20.11 | 20.17 | 20.22 | 20.28 | 20.33 | 20.39 | 20.44 | 20.50 |
| -5..... | -20.56 | -20.61 | -20.67 | -20.72 | -20.78 | -20.83 | -20.89 | -20.94 | -21.00 | -21.06 |
| 6..... | 21.11 | 21.17 | 21.22 | 21.28 | 21.33 | 21.39 | 21.44 | 21.50 | 21.56 | 21.61 |
| 7..... | 21.67 | 21.72 | 21.78 | 21.83 | 21.89 | 21.94 | 22.00 | 22.06 | 22.11 | 22.17 |
| 8..... | 22.22 | 22.28 | 22.33 | 22.39 | 22.44 | 22.50 | 22.56 | 22.61 | 22.67 | 22.72 |
| 9..... | 22.78 | 22.83 | 22.89 | 22.94 | 23.00 | 23.06 | 23.11 | 23.17 | 23.22 | 23.28 |
| -10..... | -23.33 | -23.39 | -23.44 | -23.50 | -23.56 | -23.61 | -23.67 | -23.72 | -23.78 | -23.83 |
| 11..... | 23.89 | 23.94 | 24.00 | 24.06 | 24.11 | 24.17 | 24.22 | 24.28 | 24.33 | 24.39 |
| 12..... | 24.44 | 24.50 | 24.56 | 24.61 | 24.67 | 24.72 | 24.78 | 24.83 | 24.89 | 24.94 |
| 13..... | 25.00 | 25.06 | 25.11 | 25.17 | 25.22 | 25.28 | 25.33 | 25.39 | 25.44 | 25.50 |
| 14..... | 25.56 | 25.61 | 25.67 | 25.72 | 25.78 | 25.83 | 25.89 | 25.94 | 26.00 | 26.06 |
| -15..... | -26.11 | -26.17 | -26.22 | -26.28 | -26.33 | -26.39 | -26.44 | -26.50 | -26.56 | -26.61 |
| 16..... | 26.67 | 26.72 | 26.78 | 26.83 | 26.89 | 26.94 | 27.00 | 27.06 | 27.11 | 27.17 |
| 17..... | 27.22 | 27.28 | 27.33 | 27.39 | 27.44 | 27.50 | 27.56 | 27.61 | 27.67 | 27.72 |
| 18..... | 27.78 | 27.83 | 27.89 | 27.94 | 28.00 | 28.06 | 28.11 | 28.17 | 28.22 | 28.28 |
| 19..... | 28.33 | 28.39 | 28.44 | 28.50 | 28.56 | 28.61 | 28.67 | 28.72 | 28.78 | 28.83 |
| -20..... | -28.89 | -28.94 | -29.00 | -29.06 | -29.11 | -29.17 | -29.22 | -29.28 | -29.33 | -29.39 |
| 21..... | 29.44 | 29.50 | 29.56 | 29.61 | 29.67 | 29.72 | 29.78 | 29.83 | 29.89 | 29.94 |
| 22..... | 30.00 | 30.06 | 30.11 | 30.17 | 30.22 | 30.28 | 30.33 | 30.39 | 30.44 | 30.50 |
| 23..... | 30.56 | 30.61 | 30.67 | 30.72 | 30.78 | 30.83 | 30.89 | 30.94 | 31.00 | 31.06 |
| 24..... | 31.11 | 31.17 | 31.22 | 31.28 | 31.33 | 31.39 | 31.44 | 31.50 | 31.56 | 31.61 |
| -25..... | -31.67 | -31.72 | -31.78 | -31.83 | -31.89 | -31.94 | -32.00 | -32.06 | -32.11 | -32.17 |
| 26..... | 32.22 | 32.28 | 32.33 | 32.39 | 32.44 | 32.50 | 32.56 | 32.61 | 32.67 | 32.72 |
| 27..... | 32.78 | 32.83 | 32.89 | 32.94 | 33.00 | 33.06 | 33.11 | 33.17 | 33.22 | 33.28 |
| 28..... | 33.33 | 33.39 | 33.44 | 33.50 | 33.56 | 33.61 | 33.67 | 33.72 | 33.78 | 33.83 |
| 29..... | 33.89 | 33.94 | 34.00 | 34.06 | 34.11 | 34.17 | 34.22 | 34.28 | 34.33 | 34.39 |
| -30..... | -34.44 | -34.50 | -34.56 | -34.61 | -34.67 | -34.72 | -34.78 | -34.83 | -34.89 | -34.94 |
| 31..... | 35.00 | 35.06 | 35.11 | 35.17 | 35.22 | 35.28 | 35.33 | 35.39 | 35.44 | 35.50 |
| 32..... | 35.56 | 35.61 | 35.67 | 35.72 | 35.78 | 35.83 | 35.89 | 35.94 | 36.00 | 36.06 |
| 33..... | 36.11 | 36.17 | 36.22 | 36.28 | 36.33 | 36.39 | 36.44 | 36.50 | 36.56 | 36.61 |
| 34..... | 36.67 | 36.72 | 36.78 | 36.83 | 36.89 | 36.94 | 37.00 | 37.06 | 37.11 | 37.17 |

AGM10144

HEIGHT CONVERSION FEET TO METERS

1 foot = 0.3048006 meter
1 meter = 3.2808 feet

| Feet | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | m. | m. | m. | m. | m. | m. | m. | m. | m. | m. |
| 0 | 0.000 | 0.305 | 0.610 | 0.914 | 1.219 | 1.524 | 1.829 | 2.134 | 2.438 | 2.743 |
| 10 | 3.048 | 3.353 | 3.658 | 3.962 | 4.267 | 4.572 | 4.877 | 5.182 | 5.486 | 5.791 |
| 20 | 6.096 | 6.401 | 6.706 | 7.010 | 7.315 | 7.620 | 7.925 | 8.230 | 8.534 | 8.839 |
| 30 | 9.144 | 9.449 | 9.754 | 10.058 | 10.363 | 10.668 | 10.973 | 11.278 | 11.582 | 11.887 |
| 40 | 12.192 | 12.497 | 12.802 | 13.106 | 13.411 | 13.716 | 14.021 | 14.326 | 14.630 | 14.935 |
| 50 | 15.240 | 15.545 | 15.850 | 16.154 | 16.459 | 16.764 | 17.069 | 17.374 | 17.678 | 17.983 |
| 60 | 18.288 | 18.593 | 18.898 | 19.202 | 19.507 | 19.812 | 20.117 | 20.422 | 20.726 | 21.031 |
| 70 | 21.336 | 21.641 | 21.946 | 22.250 | 22.555 | 22.860 | 23.165 | 23.470 | 23.774 | 24.079 |
| 80 | 24.384 | 24.689 | 24.994 | 25.298 | 25.603 | 25.908 | 26.213 | 26.518 | 26.822 | 27.127 |
| 90 | 27.432 | 27.737 | 28.042 | 28.346 | 28.651 | 28.956 | 29.261 | 29.566 | 29.870 | 30.175 |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 100 | 30.48 | 33.53 | 36.58 | 39.62 | 42.67 | 45.72 | 48.77 | 51.82 | 54.86 | 57.91 |
| 200 | 60.96 | 64.01 | 67.06 | 70.10 | 73.15 | 76.20 | 79.25 | 82.30 | 85.34 | 88.39 |
| 300 | 91.44 | 94.49 | 97.54 | 100.58 | 103.63 | 106.68 | 109.73 | 112.78 | 115.82 | 118.87 |
| 400 | 121.92 | 124.97 | 128.02 | 131.06 | 134.11 | 137.16 | 140.21 | 143.26 | 146.30 | 149.35 |
| 500 | 152.40 | 155.45 | 158.50 | 161.54 | 164.59 | 167.64 | 170.69 | 173.74 | 176.78 | 179.83 |
| 600 | 182.88 | 185.93 | 188.98 | 192.02 | 195.07 | 198.12 | 201.17 | 204.22 | 207.26 | 210.31 |
| 700 | 213.36 | 216.41 | 219.46 | 222.50 | 225.55 | 228.60 | 231.65 | 234.70 | 237.74 | 240.79 |
| 800 | 243.84 | 246.89 | 249.94 | 252.98 | 256.03 | 259.08 | 262.13 | 265.18 | 268.22 | 271.27 |
| 900 | 274.32 | 277.37 | 280.42 | 283.46 | 286.51 | 289.56 | 292.61 | 295.66 | 298.70 | 301.75 |
| 1000 | 304.80 | 307.85 | 310.90 | 313.94 | 316.99 | 320.04 | 323.09 | 326.14 | 329.18 | 332.23 |
| 1100 | 335.28 | 338.33 | 341.38 | 344.42 | 347.47 | 350.52 | 353.57 | 356.62 | 359.67 | 362.71 |
| 1200 | 365.76 | 368.81 | 371.86 | 374.90 | 377.95 | 381.00 | 384.05 | 387.10 | 390.14 | 393.19 |
| 1300 | 396.24 | 399.29 | 402.34 | 405.38 | 408.43 | 411.48 | 414.53 | 417.58 | 420.62 | 423.67 |
| 1400 | 426.72 | 429.77 | 432.82 | 435.86 | 438.91 | 441.96 | 445.01 | 448.06 | 451.10 | 454.15 |
| 1500 | 457.20 | 460.25 | 463.30 | 466.34 | 469.39 | 472.44 | 475.49 | 478.54 | 481.58 | 484.63 |
| 1600 | 467.68 | 490.73 | 493.78 | 496.82 | 499.87 | 502.92 | 505.97 | 509.02 | 512.07 | 515.11 |
| 1700 | 518.16 | 521.21 | 524.26 | 527.31 | 530.35 | 533.40 | 536.45 | 539.50 | 542.55 | 545.59 |
| 1800 | 548.64 | 551.69 | 554.74 | 557.79 | 560.83 | 563.88 | 566.93 | 569.98 | 573.03 | 576.07 |
| 1900 | 578.12 | 582.17 | 586.22 | 588.27 | 591.31 | 594.36 | 597.41 | 600.46 | 603.51 | 606.55 |
| 2000 | 609.60 | 612.65 | 615.70 | 618.75 | 621.79 | 624.84 | 627.89 | 630.94 | 633.99 | 637.03 |
| 2100 | 640.08 | 643.13 | 646.18 | 649.23 | 652.27 | 655.32 | 658.37 | 661.42 | 664.47 | 667.51 |
| 2200 | 670.56 | 673.61 | 676.66 | 679.71 | 682.75 | 685.80 | 688.85 | 691.90 | 694.95 | 697.99 |
| 2300 | 701.04 | 704.09 | 707.14 | 710.19 | 713.23 | 716.28 | 719.33 | 722.38 | 725.43 | 728.47 |
| 2400 | 731.52 | 734.57 | 737.62 | 740.67 | 743.71 | 746.76 | 749.81 | 752.86 | 755.91 | 758.95 |
| 2500 | 762.00 | 765.05 | 768.10 | 771.15 | 774.19 | 777.24 | 780.29 | 783.34 | 786.39 | 789.43 |
| 2600 | 792.48 | 795.53 | 798.58 | 801.63 | 804.67 | 807.72 | 810.77 | 813.82 | 816.87 | 819.91 |
| 2700 | 822.96 | 826.01 | 829.06 | 832.11 | 835.15 | 838.20 | 841.25 | 844.30 | 847.35 | 850.39 |
| 2800 | 853.44 | 856.49 | 859.54 | 862.59 | 865.63 | 868.68 | 871.73 | 874.78 | 877.83 | 880.87 |
| 2900 | 883.92 | 886.97 | 890.02 | 893.07 | 896.11 | 899.16 | 902.21 | 905.26 | 908.31 | 911.35 |
| 3000 | 914.40 | 917.45 | 920.50 | 923.55 | 926.59 | 929.64 | 932.69 | 935.74 | 938.79 | 941.83 |
| 3100 | 944.88 | 947.93 | 950.98 | 954.03 | 957.06 | 960.12 | 963.17 | 966.22 | 969.27 | 972.31 |
| 3200 | 975.36 | 978.41 | 981.46 | 984.51 | 987.55 | 990.60 | 993.65 | 996.70 | 999.75 | 1002.79 |
| 3300 | 1005.84 | 1008.89 | 1011.94 | 1014.99 | 1018.03 | 1021.08 | 1024.13 | 1027.18 | 1030.23 | 1033.27 |
| 3400 | 1036.32 | 1039.37 | 1042.42 | 1045.47 | 1048.51 | 1051.56 | 1054.61 | 1057.66 | 1060.71 | 1063.75 |
| 3500 | 1066.80 | 1069.85 | 1072.90 | 1075.95 | 1078.99 | 1082.04 | 1085.09 | 1088.14 | 1091.19 | 1094.23 |
| 3600 | 1097.28 | 1100.33 | 1103.38 | 1106.43 | 1109.47 | 1112.52 | 1115.57 | 1118.62 | 1121.67 | 1124.71 |
| 3700 | 1127.76 | 1130.81 | 1133.86 | 1136.91 | 1139.95 | 1143.00 | 1146.05 | 1149.10 | 1152.15 | 1155.19 |
| 3800 | 1158.24 | 1161.29 | 1164.34 | 1167.39 | 1170.43 | 1173.48 | 1176.53 | 1179.58 | 1182.63 | 1185.67 |
| 3900 | 1188.72 | 1191.77 | 1194.82 | 1197.87 | 1200.91 | 1203.96 | 1207.01 | 1210.06 | 1213.11 | 1216.15 |

AGM10145

HEIGHT CONVERSION FEET TO METERS CONTINUED

| Feet | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 4000-..... | 1219.2 | 1222.3 | 1225.3 | 1228.3 | 1231.4 | 1234.4 | 1237.5 | 1240.5 | 1243.6 | 1246.6 |
| 4100-..... | 1249.7 | 1252.7 | 1255.8 | 1258.8 | 1261.9 | 1264.9 | 1268.0 | 1271.0 | 1274.1 | 1277.1 |
| 4200-..... | 1280.2 | 1283.2 | 1286.3 | 1289.3 | 1292.4 | 1295.4 | 1298.5 | 1301.5 | 1304.5 | 1307.6 |
| 4300-..... | 1310.6 | 1313.7 | 1316.7 | 1319.8 | 1322.8 | 1325.9 | 1328.9 | 1332.0 | 1335.0 | 1338.1 |
| 4400-..... | 1341.1 | 1344.2 | 1347.2 | 1350.3 | 1353.3 | 1356.4 | 1359.4 | 1362.5 | 1365.5 | 1368.6 |
| 4500-..... | 1371.6 | 1374.7 | 1377.7 | 1380.7 | 1383.8 | 1386.8 | 1389.9 | 1392.9 | 1396.0 | 1399.0 |
| 4600-..... | 1402.1 | 1405.1 | 1408.2 | 1411.2 | 1414.3 | 1417.3 | 1420.4 | 1423.4 | 1426.5 | 1429.5 |
| 4700-..... | 1432.6 | 1435.6 | 1438.7 | 1441.7 | 1444.8 | 1447.8 | 1450.9 | 1453.9 | 1456.9 | 1460.0 |
| 4800-..... | 1463.0 | 1466.1 | 1469.1 | 1472.2 | 1475.2 | 1478.3 | 1481.3 | 1484.4 | 1487.4 | 1490.5 |
| 4900-..... | 1493.5 | 1496.6 | 1499.6 | 1502.7 | 1505.7 | 1508.8 | 1511.8 | 1514.9 | 1517.9 | 1521.0 |
| 5000-..... | 1524.0 | 1527.1 | 1530.1 | 1533.1 | 1536.2 | 1539.2 | 1542.3 | 1545.3 | 1548.4 | 1551.4 |
| 5100-..... | 1554.5 | 1557.5 | 1560.6 | 1563.6 | 1566.7 | 1569.7 | 1572.8 | 1575.8 | 1578.9 | 1581.9 |
| 5200-..... | 1585.0 | 1588.0 | 1591.1 | 1594.1 | 1597.2 | 1600.2 | 1603.3 | 1606.3 | 1609.3 | 1612.4 |
| 5300-..... | 1615.4 | 1618.5 | 1621.5 | 1624.6 | 1627.6 | 1630.7 | 1633.7 | 1636.8 | 1639.8 | 1642.9 |
| 5400-..... | 1645.9 | 1649.0 | 1652.0 | 1655.1 | 1658.1 | 1661.2 | 1664.2 | 1667.3 | 1670.3 | 1673.4 |
| 5500-..... | 1676.4 | 1679.5 | 1682.5 | 1685.5 | 1688.6 | 1691.6 | 1694.7 | 1697.7 | 1700.8 | 1703.8 |
| 5600-..... | 1706.9 | 1709.9 | 1713.0 | 1716.0 | 1719.1 | 1722.1 | 1725.2 | 1728.2 | 1731.3 | 1734.3 |
| 5700-..... | 1737.4 | 1740.4 | 1743.5 | 1746.5 | 1749.6 | 1752.6 | 1755.7 | 1758.7 | 1761.7 | 1764.8 |
| 5800-..... | 1767.8 | 1770.9 | 1773.9 | 1777.0 | 1780.0 | 1783.1 | 1786.1 | 1789.2 | 1792.2 | 1795.3 |
| 5900-..... | 1798.3 | 1801.4 | 1804.4 | 1807.5 | 1810.5 | 1813.6 | 1816.6 | 1819.7 | 1822.7 | 1825.8 |
| 6000-..... | 1828.8 | 1831.9 | 1834.9 | 1837.9 | 1841.0 | 1844.0 | 1847.1 | 1850.1 | 1853.2 | 1856.2 |
| 6100-..... | 1859.3 | 1862.3 | 1865.4 | 1868.4 | 1871.5 | 1874.5 | 1877.6 | 1880.6 | 1883.7 | 1886.7 |
| 6200-..... | 1889.8 | 1892.8 | 1895.9 | 1898.9 | 1902.0 | 1905.0 | 1908.1 | 1911.1 | 1914.1 | 1917.2 |
| 6300-..... | 1920.2 | 1923.3 | 1926.3 | 1929.4 | 1932.4 | 1935.5 | 1938.5 | 1941.6 | 1944.6 | 1947.7 |
| 6400-..... | 1950.7 | 1953.8 | 1956.8 | 1959.9 | 1962.9 | 1966.0 | 1969.0 | 1972.1 | 1975.1 | 1978.2 |
| 6500-..... | 1981.2 | 1984.3 | 1987.3 | 1990.3 | 1993.4 | 1996.4 | 1999.5 | 2002.5 | 2005.6 | 2008.6 |
| 6600-..... | 2011.7 | 2014.7 | 2017.8 | 2020.8 | 2023.9 | 2026.9 | 2030.0 | 2033.0 | 2036.1 | 2039.1 |
| 6700-..... | 2042.2 | 2045.2 | 2048.3 | 2051.3 | 2054.4 | 2057.4 | 2060.5 | 2063.5 | 2066.6 | 2069.6 |
| 6800-..... | 2072.6 | 2075.7 | 2078.7 | 2081.8 | 2084.8 | 2087.9 | 2090.9 | 2094.0 | 2097.0 | 2100.1 |
| 6900-..... | 2103.1 | 2106.2 | 2109.2 | 2112.3 | 2115.3 | 2118.4 | 2121.4 | 2124.5 | 2127.5 | 2130.6 |
| 7000-..... | 2133.6 | 2136.7 | 2139.7 | 2142.7 | 2145.8 | 2148.8 | 2151.9 | 2154.9 | 2158.0 | 2161.0 |
| 7100-..... | 2164.1 | 2167.1 | 2170.2 | 2173.2 | 2176.3 | 2179.3 | 2182.4 | 2185.4 | 2188.5 | 2191.5 |
| 7200-..... | 2194.6 | 2197.6 | 2200.7 | 2203.7 | 2206.8 | 2209.8 | 2212.9 | 2215.9 | 2218.9 | 2222.0 |
| 7300-..... | 2225.0 | 2228.1 | 2231.1 | 2234.2 | 2237.2 | 2240.3 | 2243.3 | 2246.4 | 2249.4 | 2252.5 |
| 7400-..... | 2255.5 | 2258.6 | 2261.6 | 2264.7 | 2267.7 | 2270.8 | 2273.8 | 2276.9 | 2279.9 | 2283.0 |
| 7500-..... | 2286.0 | 2289.1 | 2292.1 | 2295.1 | 2298.2 | 2301.2 | 2304.3 | 2307.3 | 2310.4 | 2313.4 |
| 7600-..... | 2316.5 | 2319.5 | 2322.6 | 2325.6 | 2328.7 | 2331.7 | 2334.8 | 2337.8 | 2340.9 | 2343.9 |
| 7700-..... | 2347.0 | 2350.0 | 2353.1 | 2356.1 | 2359.2 | 2362.2 | 2365.3 | 2368.3 | 2371.3 | 2374.4 |
| 7800-..... | 2377.4 | 2380.5 | 2383.5 | 2386.6 | 2389.6 | 2392.7 | 2395.7 | 2398.8 | 2401.8 | 2404.9 |
| 7900-..... | 2407.9 | 2411.0 | 2414.0 | 2417.1 | 2420.1 | 2423.2 | 2426.2 | 2429.3 | 2432.3 | 2435.4 |
| 8000-..... | 2438.4 | 2441.5 | 2444.5 | 2447.5 | 2450.6 | 2453.6 | 2456.7 | 2459.7 | 2462.8 | 2465.8 |
| 8100-..... | 2468.9 | 2471.9 | 2475.0 | 2478.0 | 2481.1 | 2484.1 | 2487.2 | 2490.2 | 2493.3 | 2496.3 |
| 8200-..... | 2499.4 | 2502.4 | 2505.5 | 2508.5 | 2511.6 | 2514.6 | 2517.7 | 2520.7 | 2523.7 | 2526.8 |
| 8300-..... | 2529.8 | 2532.9 | 2535.9 | 2539.0 | 2542.0 | 2545.1 | 2548.1 | 2551.2 | 2554.2 | 2557.3 |
| 8400-..... | 2560.3 | 2563.4 | 2566.4 | 2569.5 | 2572.5 | 2575.6 | 2578.6 | 2581.7 | 2584.7 | 2587.8 |
| 8500-..... | 2590.8 | 2593.9 | 2596.9 | 2599.9 | 2603.0 | 2606.0 | 2609.1 | 2612.1 | 2615.2 | 2618.2 |
| 8600-..... | 2621.3 | 2624.3 | 2627.4 | 2630.4 | 2633.5 | 2636.5 | 2639.6 | 2642.6 | 2645.7 | 2648.7 |
| 8700-..... | 2651.8 | 2654.8 | 2657.9 | 2660.9 | 2664.0 | 2667.0 | 2670.1 | 2673.1 | 2676.1 | 2679.2 |
| 8800-..... | 2682.2 | 2685.3 | 2688.3 | 2691.4 | 2694.4 | 2697.5 | 2700.5 | 2703.6 | 2706.6 | 2709.7 |
| 8900-..... | 2712.7 | 2715.8 | 2718.8 | 2721.9 | 2724.9 | 2728.0 | 2731.0 | 2734.1 | 2737.1 | 2740.2 |
| | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
| 9000-..... | 2743 | 2774 | 2804 | 2835 | 2865 | 2896 | 2926 | 2957 | 2987 | 3018 |
| 10000-..... | 3048 | 3078 | 3109 | 3139 | 3170 | 3200 | 3231 | 3261 | 3292 | 3322 |
| 11000-..... | 3353 | 3383 | 3414 | 3444 | 3475 | 3505 | 3536 | 3566 | 3597 | 3627 |
| 12000-..... | 3658 | 3688 | 3719 | 3749 | 3780 | 3810 | 3840 | 3871 | 3901 | 3932 |
| 13000-..... | 3962 | 3993 | 4023 | 4054 | 4084 | 4115 | 4145 | 4176 | 4206 | 4237 |
| 14000-..... | 4267 | 4298 | 4328 | 4359 | 4389 | 4420 | 4450 | 4481 | 4511 | 4542 |

AGM10146

NAUTICAL MILES TO KILOMETERS CONVERSION FOR WIND SPEED AND VISIBILITY

| | | |
|-----------------|---|--------------------------|
| 1 nautical mile | = | 6076,11549 feet |
| | = | 1.852 kilometers |
| | = | 1.15078 statute miles |
| 1 kilometer | = | 3281 feet |
| | = | 0.6215 statute miles |
| | = | 0.53946 nautical miles |
| 1 statute mile | = | 5280 feet |
| | = | 0.8689763 nautical miles |
| | = | 1.609344 kilometers |

| Nautical Miles | Kilometers | Nautical Miles | Kilometers | Nautical Miles | Kilometers |
|----------------|------------|----------------|------------|----------------|------------|
| 0 | 0 | 26 | 48.2 | 52 | 96.2 |
| 1 | 1.8 | 27 | 50.0 | 53 | 98.1 |
| 2 | 3.7 | 28 | 51.8 | 54 | 99.9 |
| 3 | 5.6 | 29 | 53.7 | 55 | 101.8 |
| 4 | 7.4 | 30 | 55.5 | 56 | 103.6 |
| 5 | 9.3 | 31 | 57.4 | 57 | 105.5 |
| 6 | 11.1 | 32 | 59.2 | 58 | 107.3 |
| 7 | 13.0 | 33 | 61.1 | 59 | 109.2 |
| 8 | 14.8 | 34 | 62.9 | 60 | 111.0 |
| 9 | 16.7 | 35 | 64.8 | 61 | 112.9 |
| 10 | 18.5 | 36 | 66.6 | 62 | 114.7 |
| 11 | 20.4 | 37 | 68.5 | 63 | 116.6 |
| 12 | 22.2 | 38 | 70.3 | 64 | 118.4 |
| 13 | 24.1 | 39 | 72.2 | 65 | 120.3 |
| 14 | 25.9 | 40 | 74.0 | 66 | 122.1 |
| 15 | 27.8 | 41 | 75.9 | 67 | 124.0 |
| 16 | 29.6 | 42 | 77.7 | 68 | 125.8 |
| 17 | 31.5 | 43 | 79.6 | 69 | 127.7 |
| 18 | 33.3 | 44 | 81.4 | 70 | 129.5 |
| 19 | 35.2 | 45 | 83.3 | 71 | 131.4 |
| 20 | 37.0 | 46 | 85.1 | 72 | 133.2 |
| 21 | 38.9 | 47 | 87.0 | 73 | 135.1 |
| 22 | 40.7 | 48 | 88.8 | 74 | 136.9 |
| 23 | 42.6 | 49 | 90.7 | 75 | 138.8 |
| 24 | 44.4 | 50 | 92.5 | | |
| 25 | 46.3 | 51 | 94.4 | | |

AGM10147

INCHES TO HECTOPASCALS (507)

| Inches | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|--------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | HECTOPASCALS | | | | | | | | | |
| 28.0 | 948.2 | 948.5 | 948.9 | 949.2 | 949.5 | 949.9 | 950.2 | 950.6 | 950.9 | 951.2 |
| 28.1 | 951.6 | 951.9 | 952.3 | 952.6 | 952.9 | 953.3 | 953.6 | 963.9 | 954.3 | 954.6 |
| 28.2 | 955.0 | 955.3 | 955.6 | 956.0 | 956.3 | 956.7 | 957.0 | 957.3 | 957.7 | 958.0 |
| 28.3 | 958.3 | 958.7 | 959.0 | 959.4 | 959.7 | 960.0 | 960.4 | 960.7 | 961.1 | 961.4 |
| 28.4 | 961.7 | 962.1 | 962.4 | 967.7 | 963.1 | 963.4 | 963.8 | 964.1 | 964.4 | 964.8 |
| 28.5 | 965.1 | 965.6 | 965.8 | 966.1 | 966.5 | 966.8 | 967.2 | 967.5 | 967.8 | 968.2 |
| 28.6 | 968.5 | 968.8 | 969.2 | 969.5 | 969.9 | 970.2 | 970.5 | 970.9 | 971.2 | 971.6 |
| 28.7 | 971.9 | 972.2 | 972.6 | 972.9 | 973.2 | 973.6 | 973.9 | 974.3 | 974.6 | 974.9 |
| 28.8 | 975.3 | 975.6 | 976.0 | 976.3 | 976.6 | 977.0 | 977.3 | 977.6 | 978.0 | 978.3 |
| 28.9 | 978.7 | 979.0 | 979.3 | 979.7 | 980.0 | 980.4 | 980.7 | 981.0 | 981.4 | 981.7 |
| 29.0 | 982.1 | 982.4 | 982.7 | 983.1 | 983.4 | 983.7 | 984.1 | 984.4 | 984.8 | 985.1 |
| 29.1 | 985.4 | 985.8 | 986.1 | 986.5 | 986.8 | 987.1 | 987.5 | 987.8 | 988.1 | 988.5 |
| 29.2 | 988.8 | 989.2 | 989.5 | 989.8 | 990.2 | 990.5 | 990.9 | 991.2 | 991.5 | 991.9 |
| 29.3 | 992.2 | 992.5 | 992.9 | 993.2 | 993.6 | 993.9 | 994.2 | 994.6 | 994.9 | 995.3 |
| 29.4 | 995.6 | 995.9 | 996.3 | 996.6 | 997.0 | 997.3 | 997.6 | 998.0 | 998.3 | 998.6 |
| 29.5 | 999.0 | 999.3 | 999.7 | 1000.0 | 1000.3 | 1000.7 | 1001.0 | 1001.4 | 1001.7 | 1002.0 |
| 29.6 | 1002.4 | 1002.7 | 1003.0 | 1003.4 | 1003.7 | 1004.1 | 1004.4 | 1004.7 | 1005.1 | 1005.4 |
| 29.7 | 1005.8 | 1006.1 | 1006.4 | 1006.8 | 1007.1 | 1007.4 | 1007.8 | 1008.1 | 1008.5 | 1008.8 |
| 29.8 | 1009.1 | 1009.5 | 1009.8 | 1010.2 | 1010.5 | 1010.8 | 1011.2 | 1011.5 | 1011.9 | 1012.2 |
| 29.9 | 1012.5 | 1012.9 | 1013.2 | 1013.5 | 1013.9 | 1014.2 | 1014.6 | 1014.9 | 1015.2 | 1015.6 |
| 30.0 | 1015.9 | 1016.3 | 1016.6 | 1016.9 | 1017.3 | 1017.4 | 1017.9 | 1018.3 | 1018.6 | 1019.0 |
| 30.1 | 1019.3 | 1019.6 | 1020.0 | 1020.3 | 1020.7 | 1021.0 | 1021.3 | 1021.7 | 1022.0 | 1022.3 |
| 30.2 | 1022.7 | 1023.0 | 1023.4 | 1023.7 | 1024.0 | 1024.4 | 1024.7 | 1025.1 | 1025.4 | 1025.7 |
| 30.3 | 1026.1 | 1026.4 | 1026.8 | 1027.1 | 1027.4 | 1027.8 | 1028.1 | 1028.4 | 1028.8 | 1029.1 |
| 30.4 | 1029.5 | 1029.8 | 1030.1 | 1030.5 | 1030.8 | 1031.2 | 1031.5 | 1031.8 | 1032.2 | 1032.5 |
| 30.5 | 1032.8 | 1033.2 | 1033.5 | 1033.9 | 1034.2 | 1034.5 | 1034.9 | 1035.2 | 1035.6 | 1035.9 |
| 30.6 | 1036.2 | 1036.6 | 1036.9 | 1037.2 | 1037.6 | 1037.9 | 1038.3 | 1038.6 | 1038.9 | 1039.3 |
| 30.7 | 1039.6 | 1040.0 | 1040.3 | 1040.6 | 1041.0 | 1041.3 | 1041.7 | 1042.0 | 1042.3 | 1042.7 |
| 30.8 | 1043.0 | 1043.3 | 1043.7 | 1044.0 | 1044.4 | 1044.7 | 1045.0 | 1045.4 | 1045.7 | 1046.1 |
| 30.9 | 1046.4 | 1046.7 | 1047.1 | 1047.4 | 1047.7 | 1048.1 | 1048.4 | 1048.8 | 1049.1 | 1049.4 |

HECTOPASCALS TO INCHES (507)

| HECTOPASCALS | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Inches | | | | | | | | | |
| 940 | 27.76 | 27.79 | 27.82 | 27.84 | 27.88 | 27.91 | 27.94 | 27.96 | 27.99 | 28.02 |
| 950 | 28.05 | 28.08 | 28.11 | 28.14 | 28.17 | 28.20 | 28.23 | 28.26 | 28.29 | 28.32 |
| 960 | 28.35 | 28.38 | 28.41 | 28.44 | 28.47 | 28.50 | 28.53 | 28.56 | 28.59 | 28.61 |
| 970 | 28.64 | 28.67 | 28.70 | 28.73 | 28.76 | 28.79 | 28.82 | 28.85 | 28.88 | 28.91 |
| 980 | 28.94 | 28.97 | 29.00 | 29.03 | 29.06 | 29.09 | 29.12 | 29.15 | 29.18 | 29.21 |
| 990 | 29.23 | 29.26 | 29.29 | 29.32 | 29.35 | 29.38 | 29.41 | 29.44 | 29.47 | 29.50 |
| 1000 | 29.53 | 29.56 | 29.59 | 29.62 | 29.65 | 29.68 | 29.71 | 29.74 | 29.77 | 29.80 |
| 1010 | 29.83 | 29.85 | 29.88 | 29.91 | 29.94 | 29.97 | 30.00 | 30.03 | 30.06 | 30.09 |
| 1020 | 30.12 | 30.15 | 30.18 | 30.21 | 30.24 | 30.27 | 30.30 | 30.33 | 30.36 | 30.39 |
| 1030 | 30.42 | 30.45 | 30.47 | 30.50 | 30.53 | 30.56 | 30.59 | 30.62 | 30.65 | 30.68 |
| 1040 | 30.71 | 30.74 | 30.77 | 30.80 | 30.83 | 30.86 | 30.89 | 30.92 | 30.95 | 30.98 |
| 1050 | 31.01 | 31.04 | 31.07 | 31.10 | 31.12 | 31.15 | 31.18 | 31.21 | 31.24 | 31.27 |

| Proportional Parts | Inches | .001 | .002 | .003 | .004 | .005 | .006 | .007 | .008 | .009 |
|--------------------|--------------|------|------|------|------|------|------|------|------|------|
| | HECTOPASCALS | 00 | .1 | .1 | .1 | .2 | .2 | .2 | .3 | .3 |

AGM10148

APPENDIX III

TIME ZONES

For reckoning time, the surface of the globe has been divided into 24 zones; each is bounded by meridians of 15° of arc, and each is 1 hour in longitude. The initial time zone lies between $7\frac{1}{2}^{\circ}\text{E}$ and $7\frac{1}{2}^{\circ}\text{W}$ of the Prime Meridian; it is called ZONE ZERO. Each zone, in turn, is designated by the number that represents the difference between local zone time and Coordinated Universal Time (UTC). See figure AIII-1. Zones have been modified near land to accord with the boundaries of the countries or the regions using corresponding time.

The zones lying east of zone zero are numbered 1 through 12 and are designated minus. And for each of the minus zones, the zone number is subtracted from the local time to obtain UTC. The zones west of zone zero are also numbered from 1 through 12 but are designated plus, since the zone number must be added to the local time to get UTC. The twelfth zone is divided by the 180th meridian, the minus half lying in east longitude and the plus half in west longitude. The zone number preceded by a plus or a minus sign constitutes the zone description. In addition to the time zone number, each zone is also designated by a letter *A* through *M* (*J* omitted) for the minus zones, and *N* through *Y* for the plus zones. (See top of figure AIII-1.)

Date/time groups (DTGs) are frequently used to express times of specific events, such as the time a message was written. A date/time group always contains 6 digits; The first 2 digits are the day of the month, and the last 4 digits are the time, using the 24-hour clock. The appropriate time zone letter designator follows the 6-digit date/time.

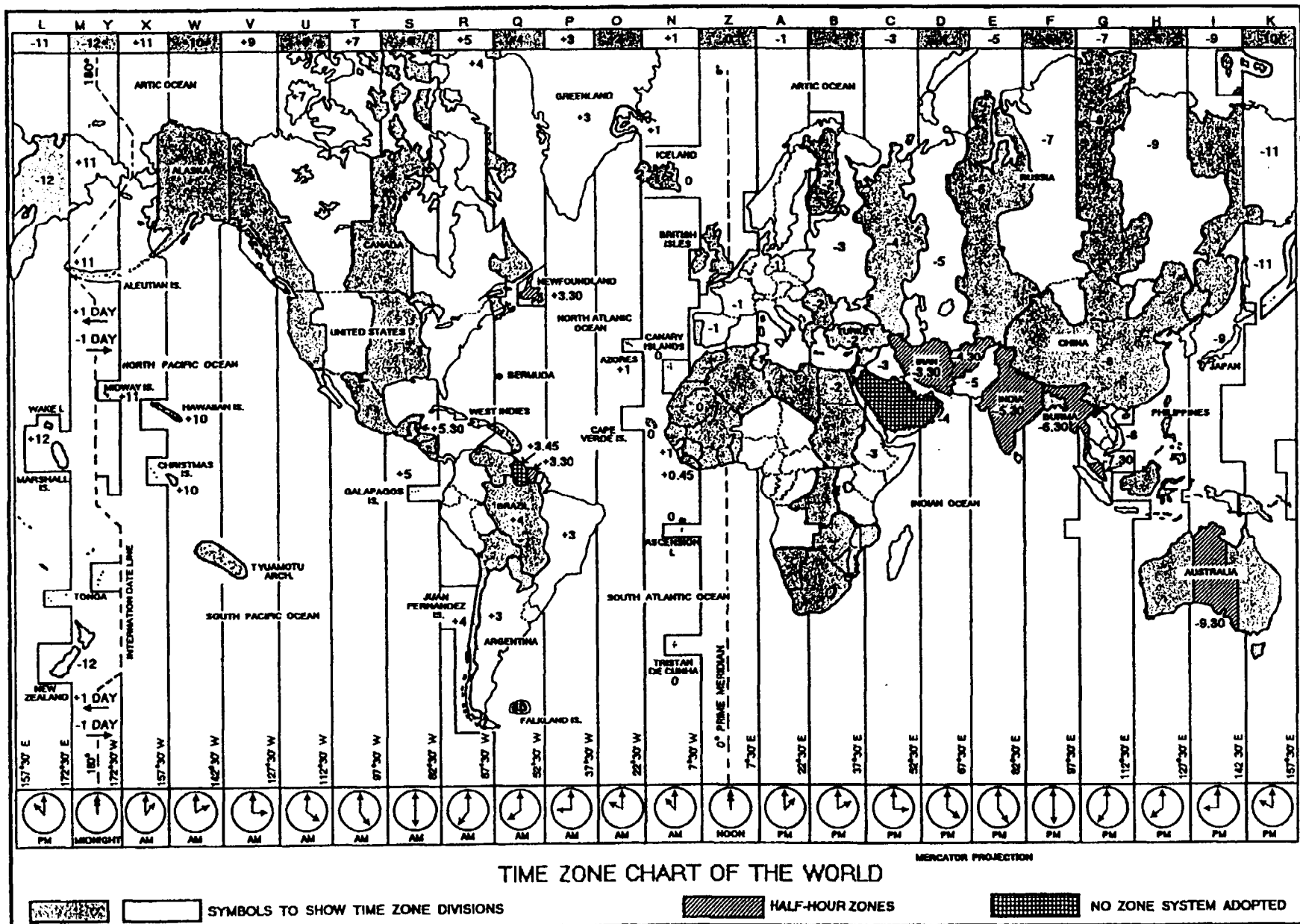
Local times may be used in the text of a message or letter. When local time is used, it must be accompanied by the zone letter-such as 08124. If local time is referred to frequently in the text, the suffix may be omitted provided a covering expression, such as "ALL TIMES QUEBEC", is used.

When it is necessary to indicate a date alone in a message, it is expressed by the day of the month, the three-letter abbreviation of the month, and (if necessary) the last two figures of the year: 3 FEB or 3 FEB 97. A night is expressed by the word *night* and the two dates over which it extends: NIGHT 3/4 FEB 97.

TIME CONVERSION TABLE

The time conversion table (table AIII-1) is useful for converting the time in one zone to the time in any other zone. Vertical columns indicate time zones. Zone *Z* is UTC. Time in each successive zone to the right of zone *Z* is 1 hour later, and to the left of zone *Z* is 1 hour earlier.

To calculate time in zone *I* when it is 1200 hours in zone *U*, for example, proceed as follows: Find 1200 in column *U* and locate the corresponding time in the line in column *I* (0500). Since both of the times (1200 in zone *U* and 0500 in zone *I*) are not in the "same day" area of table AIII-1, the time 0500 in zone *I* is tomorrow to the time 1200 in zone *U*. In other words, when it is 1200 in zone *U*, it is 0500 tomorrow in zone *I*; or when it is 0500 in zone *I*, it is 1200 yesterday in zone *U*.



AGM1F253

Figure AIII-1.—Time zones of the world.

AGM1F252

APPENDIX IV





































































































WMO CODE TABLES

This appendix contains graphic or tabular representations of many of the code tables referenced in this training manual. The wording of the code tables has been simplified in some cases to clarify the meaning.

| WMO CODE TABLE | APPENDIX PAGE |
|--|---------------|
| 0200 - (a) Pressure tendency | AIV-3 |
| 0264 - (a ₃) Standard isobaric surface | AIV-18 |
| 0265 - (a ₄) Type of equipment used | AIV-18 |
| 0439 - (b _i) Ice of land origin | AIV-17 |
| 0500 - (C) Genus of cloud. | AIV-3 |
| 0509 - (C _H) High cloud reporting codes | AIV-3, 8, 9 |
| 0513 - (C _L) Low cloud reporting codes | AIV-3, 4, 5 |
| 0515 - (CM) Mid cloud reporting codes. | AIV-3, 6, 7 |
| 0639 - (c _i) Concentration or arrangement of sea ice | AIV-16 |
| 0700 - (D _S) Direction or bearing in one figure | AIV-10 |
| 0739 - (D _i) True bearing of principle ice edge | AIV-17 |
| 0822 - (d _T) Amount of temperature change | AIV-14 |
| 0901 - (E) State of the ground without snow or ice | AIV-11 |
| 0975 - (E') State of the ground with snow or ice | AIV-10 |
| 1600 - (h) Height above surface of base of lowest cloud | AIV-11 |
| 1677 - (h _s h _s or h _t h _t) Height in two figures | AIV-12 |
| 1690 - (h _s h _s h _s) Height or altitude in three figures | AIV-13 |
| 1734 - (I _d) Indicator, hundreds or tens value (hPa) | AIV-19 |
| 1751 - (I _S) Ice accretion on ships | AIV-16 |
| 1819 - (i _R) Indicator, inclusion or omission of precip data. | AIV-14 |
| 1855 - (i _W) Indicator, source and units of wind speed | AIV-14 |
| 1860 - (i _X) Indicator, type of station | AIV-14 |
| 2590 - (MMM) Marsden square number | AIV-20 |
| 2700 - (N) Total cloud cover | AIV-3, 13 |
| 3333 - (Q _C) Quadrant of the globe. | AIV-19 |
| 3551 - (R _S) Rate of ice accretion on ships. | AIV-16 |
| 3739 - (S _i) Stage of sea ice development. | AIV-18 |
| 3850 - (S _S) Sign and type of measurement for SST | AIV-19 |

| | |
|--|--------|
| 3855 - (s_w) Sign and type of measurement for wet-bulb temp . . . | AIV-19 |
| 4019 - (t_R) Duration of reference period | AIV-13 |
| 4377 - (VV) Horizontal visibility | AIV-15 |
| 4451 - (v_s) Ship's average speed made good past 3 hours | AIV-10 |
| 4561-(W)Past weather | AIV-3 |
| 4677 - (ww) Present weather. | AIV-2 |
| 5239 - (z_i) Ice situation and trend past 3 hours | AIV-17 |

↑ Refers to "I" only. ↑↑ Refers to "self half", "other half", and "that"

| | | | | | | | | | |
|--|---|--|--|---|--|--|--|---|--|
| 00  Cloud development NOT observed or NOT observable during past hour. 1 | 01  Clouds generally dissolving or becoming less developed during past hour. 1 | 02  State of sky on the whole unchanged during past hour. 1 | 03  Clouds generally forming or developing during past hour. 1 | 04  Visibility reduced by smoke. | 05  Haze. | 06  Widespread dust in suspension in the air, NOT raised by wind, at time of observation. | 07  Dust or sand raised by wind, at time of observation. | 08  Well developed dust devil(s) within past hour. | 09  Duststorm or sandstorm within sight of or at station during past hour. |
| 10  Mist. | 11  Patches of shallow fog at station, NOT deeper than 5 feet on land. | 12  More or less continuous shallow fog at station, NOT deeper than 5 feet on land. | 13  Lightning visible, no thunder heard. | 14  Precipitation within sight, but NOT reaching the ground. | 15  Precipitation within sight, reaching the ground, but distant from station. | 16  Precipitation within sight, reaching the ground, near to but NOT at station. | 17  Thunder heard, but no precipitation at the station. | 18  Squelch(s) within sight during past hour. | 19  Funnel cloud(s) within sight during past hour. |
| 20  Drizzle (NOT freezing and NOT falling as showers) during past hour, but NOT at time of observation. | 21  Rain (NOT freezing and NOT falling as showers) during past hour, but NOT at time of observation. | 22  Snow (NOT falling as showers) during past hour, but NOT at time of observation. | 23  Rain and snow (NOT falling as showers) during past hour, but NOT at time of observation. | 24  Freezing drizzle or freezing rain (NOT falling as showers) during past hour, but NOT at time of observation. | 25  Showers of rain during past hour, but NOT at time of observation. | 26  Showers of snow, or of rain and snow, during past hour, but NOT at time of observation. | 27  Showers of hail, or of hail and rain, during past hour, but NOT at time of observation. | 28  Fog during past hour, but NOT at time of observation. | 29  Thunderstorm (with or without precipitation) during past hour, but NOT at time of observation. |
| 30  Slight or moderate duststorm or sandstorm, has decreased during past hour. | 31  Slight or moderate duststorm or sandstorm, no appreciable change during past hour. | 32  Slight or moderate duststorm or sandstorm, has increased during past hour. | 33  Severe duststorm or sandstorm, has decreased during past hour. | 34  Severe duststorm or sandstorm, no appreciable change during past hour. | 35  Severe duststorm or sandstorm, has increased during past hour. | 36  Slight or moderate drifting snow, generally low. | 37  Heavy drifting snow, generally low. | 38  Slight or moderate drifting snow, generally high. | 39  Heavy drifting snow, generally high. |
| 40  Fog at distance at time of observation, but NOT at station during past hour. | 41  Fog in patches. | 42  Fog, sky discernible, has become thinner during past hour. | 43  Fog, sky NOT discernible, has become thinner during past hour. | 44  Fog, sky discernible, no appreciable change during past hour. | 45  Fog, sky NOT discernible, no appreciable change during past hour. | 46  Fog, sky discernible, has begun or become thicker during past hour. | 47  Fog, sky NOT discernible, has begun or become thicker during past hour. | 48  Fog, depositing rime, sky discernible. | 49  Fog, depositing rime, sky NOT discernible. |
| 50  Intermittent drizzle (NOT freezing) slight at time of observation. | 51  Continuous drizzle (NOT freezing) slight at time of observation. | 52  Intermittent drizzle (NOT freezing) moderate at time of observation. | 53  Continuous drizzle (NOT freezing) moderate at time of observation. | 54  Intermittent drizzle (NOT freezing) thick at time of observation. | 55  Continuous drizzle (NOT freezing) thick at time of observation. | 56  Slight freezing drizzle. | 57  Moderate or thick freezing drizzle. | 58  Drizzle and rain, slight. | 59  Drizzle and rain, moderate or heavy. |
| 60  Intermittent rain (NOT freezing) slight at time of observation. | 61  Continuous rain (NOT freezing) slight at time of observation. | 62  Intermittent rain (NOT freezing) moderate at time of observation. | 63  Continuous rain (NOT freezing) moderate at time of observation. | 64  Intermittent rain (NOT freezing) heavy at time of observation. | 65  Continuous rain (NOT freezing) heavy at time of observation. | 66  Slight freezing rain. | 67  Moderate or heavy freezing rain. | 68  Rain or drizzle and snow, slight. | 69  Rain or drizzle and snow, moderate. |
| 70  Intermittent fall of snow flakes, slight at time of observation. | 71  Continuous fall of snow flakes, slight at time of observation. | 72  Intermittent fall of snow flakes, moderate at time of observation. | 73  Continuous fall of snow flakes, moderate at time of observation. | 74  Intermittent fall of snow flakes, heavy at time of observation. | 75  Continuous fall of snow flakes, heavy at time of observation. | 76  Ice crystals (with or without fog). | 77  Snow grains (with or without fog). | 78  Isolated sleetlike snow crystals (with or without fog). | 79  Ice pellets (sleet, U.S. definition). |
| 80  Slight rain shower(s). | 81  Moderate or heavy rain shower(s). | 82  Violent rain shower(s). | 83  Slight shower(s) of rain and snow mixed. | 84  Moderate or heavy shower(s) of rain and snow mixed. | 85  Slight snow shower(s). | 86  Moderate or heavy snow shower(s). | 87  Slight shower(s) of snow or small hail with or without rain or rain and snow mixed. | 88  Moderate or heavy shower(s) of snow or small hail with or without rain or rain and snow mixed. | 89  Slight shower(s) of hail with or without rain or rain and snow mixed, not associated with thunder. ↑↑ |
| 90  Moderate or heavy shower(s) of hail T, with or without rain and snow mixed, not associated | 91  Slight rain at time of observation; thunderstorm during past hour, but NOT at time of observation. | 92  Moderate or heavy rain at time of observation; thunderstorm during past hour, but NOT at time of observation. | 93  Slight snow or rain and snow mixed or hail T at time of observation; thunderstorm during past hour, but NOT at time of observation. | 94  Moderate or heavy snow, or rain and snow mixed or hail T at time of observation; thunderstorm during past hour, but NOT at time of observation. | 95  Slight or moderate thunderstorm without hail T, but with rain and/or snow at time of observation. | 96  Slight or moderate thunderstorm, with hail T, at time of observation. | 97  Heavy thunderstorm, without hail T, but with rain and/or snow at time of observation. | 98  Thunderstorm combined with duststorm or sandstorm at time of observation. | 99  Heavy thunderstorm with hail T at time of observation. |

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Figure AIV-1.—Present weather plotting symbols for code figure ww based on WMO Code table 4677.

| C_L Clouds of type C_L | C_M Clouds of type C_M | C_H Clouds of type C_H | C Type of Cloud | W Past Weather | N Total amount all clouds | a Barometer characteristic |
|--|--|---|----------------------|--|---|---|
| 0 No Sc, St, Cu, or Cb clouds. | 0 No Ac, As, or Ns clouds. | 0 No Ci, Cc, or Ce clouds. | 0 Ci | 0 Cloud covering 1/2 or less of sky throughout the period. | 0 No clouds. | 0 Rising then falling. Now higher than, the same as, 3 hours ago. |
| 1 Ragged Cu, other than bad weather, or Cu with little vertical development and seemingly flattened, or both. Priority 6 | 1 As, the greatest part of which is semitransparent through which the sun or moon may be faintly visible as through ground glass. Priority 9 | 1 Filaments, strands, or hooks of Ci, not increasing. Priority 9 | 1 Cc | 1 Cloud covering more than 1/2 of sky during part of period and covering 1/2 or less during part of period. | 1 One eighth or less, but not zero. | 1 Rising, then steady, or rising, then rising more slowly. Now higher than 3 hours ago. |
| 2 Cu of considerable development, generally towering, with or without other Cu or Sc; bases at same level. Priority 5 | 2 As the greatest part of which is sufficiently dense to hide the sun or moon, or Ns. Priority 8 | 2 Dense Ci in patches or twisted sheaves, usually not increasing; or Ci with towers or battlements or resembling cumiform tufts. Priority 8 | 2 Cs | 2 Cloud covering more than 1/2 of sky throughout period. | 2 Two eighths. | 2 Rising (steadily or unsteadily). Now higher than 3 hours ago. |
| 3 Cb with tops lacking clear-out outlines, but are clearly not fibrous, cirriform, or anvil shaped; Cu, Sc, or St may be present. Priority 2 | 3 Ac (most of layer is semitransparent) other than overcast or in cumiform tufts; cloud elements change but slowly with all bases at a single level. Priority 7 | 3 Ci, often anvil-shaped, derived from or associated with Cb. Priority 7 | 3 Ac | 3 Sandstorm, or duststorm, or drifting or blowing snow. | 3 Three eighths. | 3 Falling or steady, then rising, or rising then rising more rapidly. Now higher than 3 hours ago. |
| 4 Sc formed by spreading out of Cu; Cu may be present also. Priority 3 | 4 Patches of semitransparent Ac which are at one or more levels; cloud elements are continuously changing. Priority 6 | 4 Ci, hook-shaped and/or filamentous, spreading over the sky and generally becoming denser as a whole. Priority 8 | 4 As | 4 Fog, or thick haze. | 4 Four eighths. | 4 Steady. Same as three hours ago. |
| 5 Sc not formed by spreading out of Cu. Priority 7 | 5 Semitransparent Ac in bands or Ac in one more or less continuous layer gradually spreading over sky and usually thickening as a whole; the layer may be opaque or a double sheet. Priority 5 | 5 Ci, often in converging bands, and Cs or Cs alone but increasing and growing denser as a whole; the continuous veil not exceeding 45° above horizon. Priority 5 | 5 Ns | 5 Drizzle. | 5 Five eighths. | 5 Falling, then rising. Now lower than, or the same as, 3 hours ago. |
| 6 St in a more or less continuous layer and/or ragged shreds, but no Fs or bad weather. Priority 8 | 6 Ac formed by the spreading out of Cu. Priority 4 | 6 Ci, often in converging bands, and Cs or Cs alone but increasing and growing denser as a whole; the continuous veil exceeds 45° above horizon but sky not totally covered. Priority 4 | 6 Sc | 6 Rain. | 6 Six eighths. | 6 Falling then steady, or falling, then falling more slowly. Now lower than 3 hours ago. |
| 7 Fs and/or Fc of bad weather (scud) usually under As and Ns. Priority 9 | 7 Double-layered Ac or an opaque layer of Ac, not increasing over the sky; or Ac coexisting with As or Ns or with both. Priority 3 | 7 Veil of Cs completely covering the sky. Priority 3 | 7 St | 7 Snow, or rain and snow mixed, or ice pellets (sleet). | 7 Seven eighths. | 7 Falling (steadily or unsteadily). Now lower than 3 hours ago. |
| 8 Cu and Sc (not formed by spreading out of Cu); base of Cu at a different level than base of Sc. Priority 4 | 8 Ac with sprouts in the form of small towers or battlements or Ac having the appearance of cumiform tufts. Priority 2 | 8 Cs not increasing and not completely covering the sky. Priority 2 | 8 Cu | 8 Shower(s). | 8 Eight eighths. | 8 Steady or rising, then falling; or falling, then falling more rapidly. Now lower than 3 hours ago. |
| 9 Cb having a clearly fibrous (cirriform) top, often anvil-shaped, with or without Cu, Sc, St, or s.d. Priority 1 | 9 Ac, generally at several layers in a chaotic sky; dense Cirrus is usually present. Priority 1 | 9 Cc alone or Cc accompanied by Ci and/or Cs, but Cc is the predominate cirriform cloud. Priority 1 | 9 Cb | 9 Thunderstorm, with or without precipitation. | 9 Sky obscured, or cloud amount cannot be estimated. | 9 Indicator figure. Regionally agreed elements and NOT "pp" are reported by the next two code figures. |
| 0513 AGM1F255 | 0515 | 0509 | 0500 | 4561 | 2700 | 0200 |

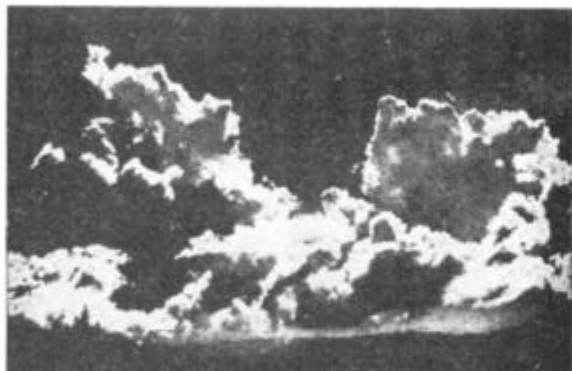
Figure AIV-2.—Plotting symbols used for code figures C_L , C_M , C_H , C , W , N , a .

L1



1. Cumulus humilis.

L2



2. Cumulus congestus.

L2



3. Cumulus congestus.

L4



4. Cumulonimbus colvus.

L5



5. Stratocumulus cumulogenitus.

L6



6. Stratocumulus.

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Figure AIV-3.—Examples of the 9 low-level sky states reported for code C_L , based on WMO Code table 0513.

L 6

—



7. Stratus.

L 7



8. Cumulus fractus of bad weather.

L 8



9. Cumulus humilis and stratocumulus.

L 8



10. Cumulus congestus and stratocumulus.

L 9



11. Cumulonimbus capillatus.

L 9



12. Cumulonimbus capillatus.

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Figure AIV-3.—Examples of the 9 low-level sky states reported for code C_L, based on WMO Code table 0513—Continued.

M 1



13. Altostratus translucidus.

M 4



16. Altocumulus lenticularis.

M 2



14. Altostratus opacus.

M 5



17. Altocumulus translucidus undulatus.

M 3



15. Altocumulus translucidus.

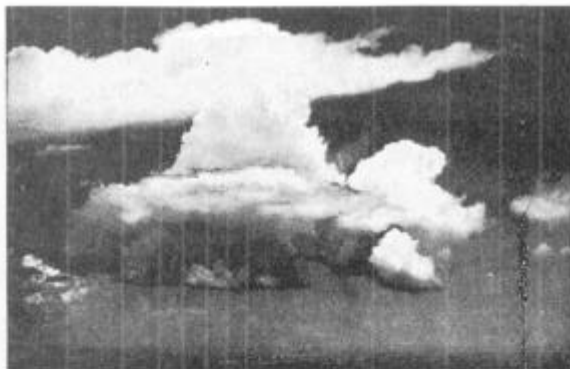
M 6



18. Altocumulus cumulogenitus

Figure AIV-4.—Examples of the 9 mid-level sky states reported for code C_M , based on WMO Code table 0515.

M6



19. Altocumulus cumulonimbogenitus.

M7



20. Altocumulus duplicatus.

M7



21. Altocumulus opacus.

M8



22. Altocumulus floccus.

M8



23. Altocumulus castellanus.

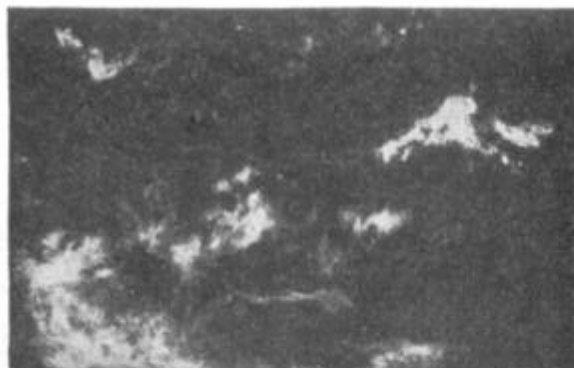
M9



24. Altocumulus of a chaotic sky.

H1

J



25. Cirrus fibratus.

H1

J



26. Cirrus fibratus.

H2

J



27. cirrus spissatus.

H3

J



28. Cirrus spissatus cumulonimbogenitus.

H3

J



29. Cirrus spissatus cumulonimbogenitus.

H4

J



30. Cirrus uncinus.

209.453

Figure AIV-5.—Examples of the 9 high-level sky states reported for code C_H , based on WMO Code table 0509.

H5

2



31. Cirrus below 45°.

H6

2



32. Cirrus above 45°.

H7

2



33. Cirrostratus covering the whole sky.

H8

1



34. Cirrostratus not covering the whole sky.

H8

1



35. Cirrostratus not covering the whole sky.

H9

2



36. Cirrocumulus.

Table AIV-1.—WMO CODE 0700

| WMO CODE 0700 | | |
|--|----------------------------------|---|
| Direction or bearing in one figure. | | |
| Reported as <u>towards</u> : | | Reported as <u>from</u> : |
| D _a , D _e , D _L , D _S | | D, D _H , D _M , D _L , D _K , D _p |
| Code 7 Northwest | Code 8 North | Code 1 Northeast |
| Code 6 West | Code 0 Stationary or overhead | Code 2 East |
| Code 5 Southwest | Code 4 south | Code 3 Southeast |
| Code 9 - All directions, confused, variable, or unknown. Code / - Not reported. | | |

Table AIV-2.—WMO CODE 0975

| WMO CODE 0975 | |
|---|--|
| E' - State of the ground with snow or measurable ice cover. | |
| Code | PREDOMINENT GROUND COVER |
| 0 | Ground predominately covered by ice. |
| 1 | Compact or wet snow - 0.1 to 0.4 ground covered. |
| 2 | Compact or wet snow - 0.5 to 0.9 ground covered. |
| 3 | Compact or wet snow - 1.0 coverage - EVEN layer. |
| 4 | Compact or wet snow - 1.0 coverage - UNEVEN layer. |
| 5 | Loose dry snow - 0.1 to 0.4 ground covered. |
| 6 | Loose dry snow - 0.5 to 0.9 ground covered. |
| 7 | Loose dry snow - complete coverage - EVEN layer. |
| 8 | Loose dry snow - complete coverage - UNEVEN layer. |
| 9 | Snow - complete coverage - DEEP DRIFTS. |

Table AIV-3.—WMO CODE 4451

| WMO CODE 4451 | |
|--|--------------|
| V _S , - Ship's average speed made good during the past 3 hours. | |
| Code | Speed |
| 0 | 0 kt |
| 1 | 1 - 5 kt |
| 2 | 6 - 10 kt |
| 3 | 11 - 15 kt |
| 4 | 16 - 20 kt |
| 5 | 21 - 25 kt |
| 6 | 26 - 30 kt |
| 7 | 31 - 35 kt |
| 8 | 36 - 40 kt |
| 9 | over 40 kts |
| / | Not reported |

Table AIV-4.—WMO CODE 0901

| WMO CODE 0901 | |
|--|---|
| E - State of the mound without snow or measurable ice cover. | |
| Code | STATE OF THE GROUND |
| 0 | Dry (without cracks, dust, or lose sand). |
| 1 | Moist. |
| 2 | Wet (standing puddles). |
| 3 | Flooded. |
| 4 | Frozen. |
| 5 | Glaze ice. |
| 6 | Patchy loose dust or sand. |
| 7 | Thin layer of loose dust or sand covers ground completely. |
| 8 | Moderate or thick layer of loose dust or sand covers ground completely. |
| 9 | Extremely dry with cracks. |

Table AIV-5.—WMO CODE 1600

| WMO CODE 1600 | Code | Meters | *Feet |
|---|------|------------------------|--------------------------|
| h - Height above surface of the base of the lowest clouds seen. * U.S. observers use the modified scale in feet. | 0 | 0 to 49 | 0 to 99 |
| | 1 | 50 to 99 | 100 to 299 |
| | 2 | 100 to 199 | 300 to 699 |
| | 3 | 200 to 299 | 700 to 999 |
| | 4 | 300 to 599 | 1000 to 1999 |
| | 5 | 600 to 999 | 2000 to 3299 |
| | 6 | 1000 to 1499 | 3300 to 4899 |
| | 7 | 1500 to 1999 | 4900 to 6499 |
| | 8 | 2000 to 2499 | 6500 to 7999 |
| | 9 | No clouds or ≥2500m | No clouds or ≥ 8000ft |
| | / | Unknown | Unknown |

Table AIV-6.—WMO CODE 1677

| WMO CODE 1677 | | | | | | | | | | | |
|---|--------|------|------|--------|------|------|--------|-------|------|---------|--------|
| h _s h _s - Height of base of cloud layer or mass indicated by genus C. | | | | | | | | | | | |
| h _t h _t - Height of tops of low cloud or fog layer. | | | | | | | | | | | |
| * U.S. observers use the modified scale in feet. | | | | | | | | | | | |
| code | meters | feet | code | meters | feet | code | meters | feet | code | meters | feet |
| 00 | <30 | <100 | 25 | 750 | 2500 | 50 | 1500 | 5000 | 75 | 7500 | 25000 |
| 01 | 30 | 100 | 26 | 780 | 2600 | 51 | - | | 76 | 7800 | 26000 |
| 02 | 60 | 200 | 27 | 810 | 2700 | 52 | not | | 77 | 8100 | 27000 |
| 03 | 90 | 300 | 28 | 840 | 2800 | 53 | - | | 78 | 8400 | 28000 |
| 04 | 120 | 400 | 29 | 870 | 2900 | 54 | used | | 79 | 8700 | 29000 |
| 05 | 150 | 500 | 30 | 900 | 3000 | 55 | - | | 80 | 9000 | 30000 |
| 06 | 180 | 600 | 31 | 930 | 3100 | 56 | 1800 | 6000 | 81 | 10500 | 35000 |
| 07 | 210 | 700 | 32 | 960 | 3200 | 57 | 2100 | 7000 | 82 | 12000 | 40000 |
| 08 | 240 | 800 | 33 | 990 | 3300 | 58 | 2400 | 8000 | 83 | 13500 | 45000 |
| 09 | 270 | 900 | 34 | 1020 | 3400 | 59 | 2700 | 9000 | 84 | 15000 | 50000 |
| 10 | 300 | 1000 | 35 | 1050 | 3500 | 60 | 3000 | 10000 | 85 | 16500 | 55000 |
| 11 | 330 | 1100 | 36 | 1080 | 3600 | 61 | 3300 | 11000 | 86 | 18000 | 60000 |
| 12 | 360 | 1200 | 37 | 1110 | 3700 | 62 | 3600 | 12000 | 87 | 19500 | 65000 |
| 13 | 390 | 1300 | 38 | 1140 | 3800 | 63 | 3900 | 13000 | 88 | 2 1000 | 70000 |
| 14 | 420 | 1400 | 39 | 1170 | 3900 | 64 | 4200 | 14000 | 89 | >2 1000 | >70000 |
| 15 | 450 | 1500 | 40 | 1200 | 4000 | 65 | 4500 | 15000 | | | |
| 16 | 480 | 1600 | 41 | 1230 | 4100 | 66 | 4800 | 16000 | | | |
| 17 | 510 | 1700 | 42 | 1260 | 4200 | 67 | 5100 | 17000 | | | |
| 18 | 540 | 1800 | 43 | 1290 | 4300 | 68 | 5400 | 18000 | | | |
| 19 | 570 | 1900 | 44 | 1320 | 4400 | 69 | 5700 | 19000 | | | |
| 20 | 600 | 2000 | 45 | 1350 | 4500 | 70 | 6000 | 20000 | | | |
| 21 | 630 | 2100 | 46 | 1380 | 4600 | 71 | 6300 | 21000 | | | |
| 22 | 660 | 2200 | 47 | 1410 | 4700 | 72 | 6600 | 22000 | | | |
| 23 | 690 | 2300 | 48 | 1440 | 4800 | 73 | 6900 | 23000 | | | |
| 24 | 720 | 2400 | 49 | 1470 | 4900 | 74 | 7200 | 24000 | | | |

Table AIV-7.—WMO CODE 1690

| WMO CODE 1690 | |
|--|---|
| $h_B h_B h_B$ | - Height of lowest level of turbulence. |
| $h_i h_i h_i$ | - Height of lowest level of icing. |
| $h_f h_f h_f$ | - Altitude of 0°C isotherm. |
| $h_t h_t h_t$ | - Altitude of cloud layer or mass. |
| $h_x h_x h_x$ | - Altitude to which temperature and wind refer. |
| $h_s h_s h_s$ | - Height of base of cloud layer or vertical visibility. |
| Code figures 000 to 099 are in single-unit increments, code figures 100 to 990 are in ten-unit increments. | |
| Code figures are the number of 30-meter units of height or altitude. This is nearly identical with the U.S. convention of reporting heights or altitudes in hundreds of feet. A few examples follow: | |
| code 000 = <30 meters = <100 feet | |
| code 001 = 1 30-meter increment (30 meters), used as 100 feet | |
| code 002 = 2 30-meter increments (60 meters), used as 200 feet | |
| code 099 = 99 30-meter increments (2970 meters), used as 9,900 feet | |
| code 990 = 990 30-meter increments (29,700 meters), used as 99,000 feet | |

Table AIV-8.—WMO CODE 2700

| WMO CODE 2700 | | |
|---|----------------------------|--------|
| N - Total cloud cover. | | |
| N_h - Amount of cloud in a layer. | | |
| N_s - Amount of individual cloud layer with genus indicated by C. | | |
| N' - Amount of cloud with base below station level. | | |
| Code | Eights | Tenths |
| 0 | 0 | 0 |
| 1 | ≤1 | ≤1 |
| 2 | 2 | 2-3 |
| 3 | 3 | 4 |
| 4 | 4 | 5 |
| 5 | 5 | 6 |
| 6 | 6 | 7-8 |
| 7 | 7 | 9 |
| 8 | 8 | 10 |
| 9 | Sky obscured | |
| / | Sky condition not observed | |

Table AIV-9.—WMO CODE 4019

| WMO CODE 4019 | |
|--|-------------------------------|
| t_R - Duration of reference period for the amount of precipitation ending at the time of the report. | |
| Code | Period preceeding observation |
| 1 | 6 hours |
| 2 | 12 hours |
| 3 | 18 hours |
| 4 | 24 hours |
| 5 | 1 hour |
| 6 | 2 hours |
| 7 | 3 hours |
| 8 | 9 hours |
| 9 | 15 hours |

Table AIV-10.—WMO CODE 1819

| WMO CODE 1819 | |
|---|--------------------------------------|
| i_R - Indicator for inclusion or ommission of precipitation data. | |
| Code | Data group 6RRR t_R is: |
| 0 | Included in section 1 & 3. |
| 1 | Included in section 1. |
| 2 | Included in section 3. |
| 3 | Omitted - Precipitation amount = 0). |
| 4 | Omitted - Measurement not available. |

Table AIV-11.—WMO CODE 1855

| WMO CODE 1855 | | |
|---|------------------|--------------------|
| i_w - Indicator for source and units of wind speed. | | |
| Code | Source | Units |
| 0 | Estimated. | Meters per second. |
| 1 | From anemometer. | |
| 3 | Estimated. | Knots. |
| 4 | From anemometer. | |

Table AIV-12.—WMO CODE 1860

| WMO CODE 1860 | | |
|---|--------------|--|
| i_x - Indicator for type of station operation and inclusion of present and past weather data. | | |
| Code | Station Type | Group 7wwW ₁ W ₂ is: |
| 1 | Manned. | Included. |
| 2 | Manned. | Omitted - No significant weather. |
| 3 | Manned. | Omitted - Not observed. |
| 4 | Automatic. | Included (Codes 4677 & 4561). |
| 5 | Automatic. | Omitted - No significant weather. |
| 6 | Automatic. | Omitted - Not observed. |
| 7 | Automatic. | Included (Codes 4680 & 4531). |

Table AIV-13.—WMO CODE 0822

| WMO CODE 0822 | |
|--------------------------------------|--------|
| D_T - Amount of temperature change | |
| Code | Change |
| 0 | 10°C |
| 1 | 11°C |
| 2 | 12°C |
| 3 | 13°C |
| 4 | ≥ 14°C |
| 5 | 5°C |
| 6 | 6°C |
| 7 | 7°C |
| 8 | 8°C |
| 9 | 9°C |

TABLE AIV-14.—WMO CODE 4377

| WMO CODE 4377 | | | | | | | | | | |
|---|-------------------|------|-----|-------------------|------|-----|----|---------|-------|------|
| VV- Horizontal visibility at the surface. | | | | | | | | | | |
| KM | MI | CODE | KM | MI | CODE | KM | MI | C O D E | K M | CODE |
| <0.1 | <1/16 | 00 | 2.6 | 1 ⁵ /8 | 26 | N U | | 51 | 26 | 76 |
| 0.1 | 1/16 | 01 | 2.7 | | 27 | O S | | 52 | 27 | 77 |
| 0.2 | 1/8 | 02 | 2.8 | 1 ³ /4 | 28 | T E | | 53 | 28 | 78 |
| 0.3 | 3/16 | 03 | 2.9 | | 29 | D | | 54 | 29 | 79 |
| 0.4 | 1/4 | 04 | 3.0 | 1 ⁷ /8 | 30 | | | 55 | 30 | 80 |
| 0.5 | 5/16 | 05 | 3.1 | | 31 | --- | | --- | --- | --- |
| 0.6 | 3/8 | 06 | 3.2 | 2 | 32 | 6 | 4 | 56 | 35 | 81 |
| 0.7 | | 07 | 3.3 | | 33 | 7 | | 57 | 40 | 82 |
| 0.8 | 1/2 | 08 | 3.4 | | 34 | 8 | 5 | 58 | 45 | 83 |
| 0.9 | | 09 | 3.5 | | 35 | 9 | | 59 | 50 | 84 |
| 1.0 | 5/8 | 10 | 3.6 | 2 ¹ /4 | 36 | 10 | 6 | 60 | 55 | 85 |
| 1.1 | | 11 | 3.7 | | 37 | 11 | 7 | 61 | 60 | 86 |
| 1.2 | 3/4 | 12 | 3.8 | | 38 | 12 | | 62 | 65 | 87 |
| 1.3 | | 13 | 3.9 | | 39 | 13 | 8 | 63 | 70 | 88 |
| 1.4 | 7/8 | 14 | 4.0 | 2 ¹ /2 | 40 | 14 | 9 | 64 | >70 | 89 |
| 1.5 | | 15 | 4.1 | | 41 | 15 | | 65 | --- | --- |
| 1.6 | 1 | 16 | 4.2 | | 42 | 16 | 10 | 66 | <0.05 | 90 |
| 1.7 | | 17 | 4.3 | | 43 | 17 | | 67 | 0.05 | 91 |
| 1.8 | 1 ¹ /8 | 18 | 4.4 | 2 ³ /4 | 44 | 18 | 11 | 68 | 0.2 | 92 |
| 1.9 | | 19 | 4.5 | | 45 | 19 | 12 | 69 | 0.5 | 93 |
| 2.0 | 1 ¹ /4 | 20 | 4.6 | | 46 | 20 | | 70 | 1 | 94 |
| 2.1 | | 21 | 4.7 | | 47 | 21 | 13 | 71 | 2 | 95 |
| 2.2 | 1 ³ /8 | 22 | 4.8 | 3 | 48 | 22 | | 72 | 4 | 96 |
| 2.3 | | 23 | 4.9 | | 49 | 23 | 14 | 73 | 10 | 97 |
| 2.4 | 1 ¹ /2 | 24 | 5.0 | | 50 | 24 | 15 | 74 | 20 | 98 |
| 2.5 | | 25 | | | | 25 | | 75 | >50 | 99 |

Table AIV-15.—WMO CODE 1751

| WMO CODE 1751 | |
|--|--------------------------|
| I _s - Ice accretion on ships. | |
| Code | Source of Ice |
| 1 | Ice from ocean spray. |
| 2 | Ice from fog. |
| 3 | Ice from spray and fog. |
| 4 | Ice from rain. |
| 5 | Ice from spray and rain. |

Table AIV-16.—WMO CODE 3551

| WMO CODE 3551 | |
|--|---------------------------------|
| R _s - Rate of ice accretion on ships. | |
| Code | Ice increase or decrease |
| 0 | Ice not building up. |
| 1 | Building up slowly. |
| 2 | Building up rapidly. |
| 3 | Melting or breaking up slowly. |
| 4 | Melting or breaking up rapidly. |

Table AIV-17.—WMO CODE 0639

| WMO CODE 0639 | | | |
|---|---|---|--|
| c _i - Concentration or arrangement of sea ice. | | | |
| Code | Description | | |
| 0 | No ice in sight. | | |
| 1 | Ship in open lead more than 1 nm wide, or ship in fast ice with ice edge out of sight. | | |
| 2 | VERY OPEN PACK ICE - less than .3 sea covered. | Ice concentration uniform in observatin area. | Ship in ice or within .5 nm of ice edge. |
| 3 | OPEN PACK ICE - .3 to .6 sea covered. | | |
| 4 | CLOSE PACK ICE - .7 to .8 sea covered. | | |
| 5 | VERY CLOSE PACK ICE - .9 sea covered. | | |
| 6 | Strips or patches of pack ice with open water between. | Ice concentration not uniform. | |
| 7 | Strips or patches of close or very-close pack ices with lesser concentration between. | | |
| 8 | Fast ice with open water or open pack ice seaward. | | |
| 9 | Fast ice with close or very close pack ice seaward. | | |
| / | Unable to report due to darkness, low visibility, or because ship is more than .5 nm from ice edge. | | |

Table AIV-18.—WMO CODE 5239

| WMO CODE 5239 | | |
|---|---|---|
| Z _i - Present ice situation and trend of conditions over preceeding 3 hours. | | |
| Code | Description | |
| 0 | Ship in open water with floating ice in sight. | |
| / | Unable to report; low visibility or darkness. | |
| 1 | Ice easily penetrable - condition improving. | Ship in ice. |
| 2 | Ice easily penetrable - condition unchanging. | |
| 3 | Ice easily penetrable - condition worsening. | |
| 4 | Ice difficult to penetrate - condition improving. | |
| 5 | Ice difficult to penetrate - condition unchanged. | |
| 6 | Ice forming and floes freezing together. | Ice difficult to penetrate, conditions worsening. |
| 7 | Ice under slight pressure. | |
| 8 | Ice under moderate or severe pressure. | |
| 9 | Ship beset. | |

Table AIV-19.—WMO CODE 0439

| WMO CODE 0439 | |
|--------------------------------------|--|
| b _i - Ice of land origin. | |
| code | Description |
| 0 | No ice of land origin. |
| 1 | 1 - 5 bergs, no growlers or bergy bits. |
| 2 | 6 - 10 bergs, no growlers or bergy bits. |
| 3 | 11 - 20 bergs, no growlers or bergy bits. |
| 4 | 1 - 10 growlers or bergy bits, no bergs. |
| 5 | >10 growlers or bergy bits, no bergs. |
| 6 | 1 - 5 bergs with growlers or bergy bits. |
| 7 | 6 - 10 bergs with growlers or bergy bits. |
| 8 | 11 - 20 bergs with growlers or bergy bits. |
| 9 | >20 bergs with growlers or bergy bits - major navigation hazard. |
| / | Unable to report because of darkness or visibility. |

Table AIV-20.—WMO CODE 0739

| WMO CODE 0739 | | |
|---|--------------------|---------------------|
| D_i - True bearing of principal ice edge. | | |
| Code 0 - Ship inshore or in flaw lead. | | |
| Code 7 Toward NW | Code 8 Toward N | Code 1 Toward NE |
| Code 6 - Toward W | Toward E - Code 2 | |
| Code 5 Toward SW | Code 4 Toward S | Code 3 Toward SE |
| Code 9 - Not determined (ship in ice). | | |
| Code / - Unable to report or only ice of land origin present. | | |

Table AIV-21.—WMO CODE 3739

| WMO CODE 3739 | |
|---|--|
| S_i - Stage of (sea ice) development. | |
| Code | Sea ice observed |
| 0 | New ice only (frazil, grease, slush, shuga). |
| 1 | Nilas or ice rind, less than 10 cm thick. |
| 2 | Young ice (grey, grey-white), 10 to 30 cm thick. |
| 3 | Mostly new and/or young ice with some first-year ice. |
| 4 | Mostly thin first-year ice with some new or young ice. |
| 5 | All thin first-year ice, 30 to 70 cm thick. |
| 6 | Mostly medium first-year ice (70 to 120 cm thick) and thick first-year ice (120 cm thick), with some thinner first-year ice. |
| 7 | All medium and thick first-year ice. |
| 8 | Mostly medium and thick first-year ice, with some old ice (usually more than 2 meters thick). |
| 9 | Mostly old ice. |
| / | Unable to report: Low visibility, darkness, only ice of land origin present, or ship is more than 0.5 nm from ice edge. |

Table AIV-22.—WMO CODE 0264

| WMO CODE 0264 | |
|---|----------|
| a_3 - Standard isobaric surface for which the geopotential height is reported | |
| Code | Level |
| 1 | 1000 hPa |
| 2 | 925 hPa |
| 5 | 500 hPa |
| 7 | 700 hPa |
| 8 | 850 hPa |

Table AIV-23.—WMO CODE 0265

| WMO CODE 0265 | |
|--|---|
| a ₄ - Type of equipment used. | |
| Code | Equipment |
| 0 | Pressure instrument in sonde |
| 1 | Optical theodolite |
| 2 | Radio theodolite |
| 3 | Radar |
| 4 | Pressure instrument in sonde, but sensor failed |
| 5 | VLF-Omega |
| 6 | Loran-C |
| 7 | Wind profiler |
| 8 | Satellite navigation |
| 9 | Reserved |

Table AIV-24.—WMO CODE 1734

| WMO CODE 1734 | | |
|---|--------------------------------|--------|
| I _d - Indicator used to specify the hundreds of hectopascals figure for the level of the last wind report. | | |
| Code | Part A | Part C |
| 1 | 100 or 150 hPa | 10 hPa |
| 2 | 200 or 250 hPa | 20 hPa |
| 3 | 300 hPa | 30 hPa |
| 4 | 400 hPa | |
| 5 | 500 hPa | 50 hPa |
| 7 | 700 hPa | 70 hPa |
| 8 | 850 hPa | |
| 9 | 925 hPa | |
| 0 | 1000 hPa | |
| / | No winds at any standard level | |

Table AIV-25.—WMO CODE 3333

| WMO CODE 3333 | | |
|---|----------|-----------|
| Q _c - Quadrant of the globe. | | |
| Code | Latitude | Longitude |
| 1 | North | East |
| 3 | South | East |
| 5 | South | West |
| 7 | North | West |

Table AIV-26.—WMO CODE 3850

| WMO CODE 3850 | |
|--|--|
| S_s - Indicator for the sign and type of measurement of sea-surface temperature. | |
| Code | Sign and method |
| 0 | positive or zero intake measurement |
| 1 | negative intake measurement |
| 2 | positive or zero bucket measurement |
| 3 | negative bucket measurement |
| 4 | positive or zero hull contact sensor |
| 5 | negative hull contact sensor |
| 6 | positive or zero neither intake, bucket, or hull |
| 7 | negative neither intake, bucket, or hull |

Table AIV-27.—WMO CODE 3850

| WMO CODE 3850 | |
|--|---|
| S_w - Indicator for sign and type of wet-bulb temperature. | |
| Code | Sign and method |
| 0 | Positive or zero measured wet-bulb temp |
| 1 | Negative measured wet-bulb temp |
| 2 | Iced bulb measured wet-bulb temp |
| 5 | Positive or zero computed wet-bulb temp |
| 6 | Negative computed wet-bulb temp |
| 7 | Iced bulb computed wet-bulb temp |

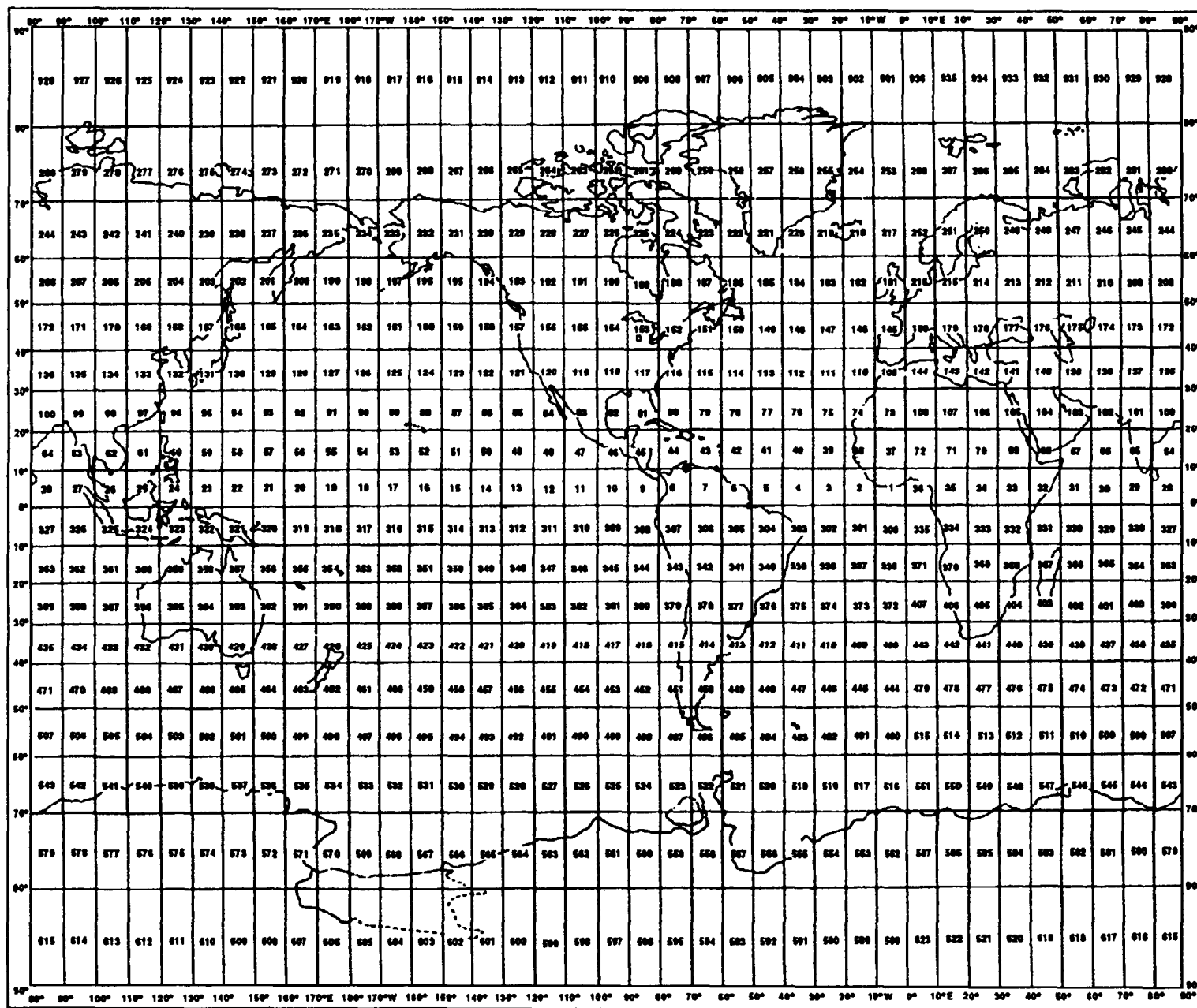


Figure AIV-6.—Marsden square number.

APPENDIX V

DESCRIPTIVE WINDS AND SEAS

| WIND SPEED | | SEAMAN'S TERM | WORLD METEOROLOGICAL ORGANIZATION | ESTIMATING WIND SPEED | | STATE OF THE SEA | | |
|------------|-------------|-----------------|-----------------------------------|--|--|------------------|------|-------------------------|
| KNOTS | KM PER HOUR | | | EFFECTS OBSERVED AT SEA | EFFECTS OBSERVED ON LAND | TERM | CODE | HEIGHT OF WAVES IN FEET |
| UNDER 1 | UNDER 1 | CALM | CALM | SEA LIKE MIRROR. | CALM; SMOKE RISES VERTICALLY. | CALM, GLASSY | 0 | 0 |
| 1-3 | 1-5 | LIGHT AIR | LIGHT AIR | RIPPLES WITH APPEARANCE OF SCALES; NO FOAM CRESTS. | SMOKE DRIFT INDICATES WIND DIRECTION; VANES DO NOT MOVE. | | | |
| 4-6 | 6-11 | LIGHT BREEZE | LIGHT BREEZE | SMALL WAVELETS; CRESTS OF GLASSY APPEARANCE, NOT BREAKING. | WIND FELT ON FACE; LEAVES RUSTLE; VANES BEGIN TO MOVE. | CALM, RIPPLED | 1 | 0 - 1/3 |
| 7-10 | 12-19 | GENTLE BREEZE | GENTLE BREEZE | LARGE WAVELETS; CRESTS BEGIN TO BREAK; SCATTERED WHITECAPS. | LEAVES, SMALL TWIGS IN CONSTANT MOTION; LIGHT FLAGS EXTENDED. | SMOOTH, WAVELETS | 2 | 1/3 - 1 2/3 |
| 11-16 | 20-28 | MODERATE BREEZE | MODERATE BREEZE | SMALL WAVES, BECOMING LONGER; NUMEROUS WHITECAPS. | DUST LEAVES, AND LOOSE PAPER RAISED UP; SMALL BRANCHES MOVE. | SLIGHT | 3 | 2-4 |
| 17-21 | 29-38 | FRESH BREEZE | FRESH BREEZE | MODERATE WAVES, TAKING LONGER FORM, MANY WHITECAPS; SOME SPRAY. | SMALL TREES IN LEAF BEGIN TO SWAY. | MODERATE | 4 | 4-8 |
| 22-27 | 39-49 | STRONG BREEZE | STRONG BREEZE | LARGER WAVES FORMING; WHITECAPS EVERYWHERE; MORE SPRAY. | LARGER BRANCHES OF TREES IN MOTION; WHISLING HEARD IN WIRES. | ROUGH | 5 | 8-13 |
| 28-33 | 50-61 | MODERATE GALE | NEAR GALE | SEA HEAPS UP; WHITE FOAM FROM BREAKING WAVES BEGINS TO BE BLOWN IN STREAKS. | WHOLE TREES IN MOTION; RESISTANCE FELT IN WALKING AGAINST WIND. | VERY ROUGH | 6 | 13-20 |
| 34-40 | 62-74 | FRESH GALE | GALE | MODERATELY HIGH WAVES OF GREATER LENGTH; EDGES OF CRESTS BEGIN TO BREAK INTO SPINDRIFT; FOAM IS BLOWN IN WELL MARKED STREAKS. | TWIGS AND SMALL BRANCHES BROKEN OFF TREES; PROGRESS GENERALLY IMPEDED. | | | |
| 41-47 | 75-88 | STRONG GALE | STRONG GALE | HIGH WAVES; SEA BEGINS TO ROLL; DENSE STREAKS OF FOAM; SPRAY MAY REDUCE VISIBILITY. | SLIGHT STRUCTURAL DAMAGE OCCURS; SLATE BLOWN FROM ROOFS. | | | |
| 48-55 | 89-102 | WHOLE GALE | STORM | VERY HIGH WAVES WITH OVERHANGING CRESTS; SEA TAKES WHITE APPEARANCE AS FOAM IS BLOWN IN VERY DENSE STREAKS; ROLLING IS HEAVY AND VISIBILITY REDUCED. | SELDOM EXPERIENCED ON LAND; TREES BROKEN OR UPROOTED; CONSIDERABLE STRUCTURAL DAMAGE OCCURS. | HIGH | 7 | 20-30 |
| 56-63 | 103-117 | STORM | VIOLENT STORM | EXCEPTIONAL HIGH WAVES; SEA COVERED WITH WHITE FOAM PATCHES; VISIBILITY STILL MORE REDUCED. | VERY RARELY EXPERIENCED ON LAND; USUALLY ACCOMPANIED BY WIDESPREAD DAMAGE. | VERY HIGH | 8 | 30-45 |
| 64+ | 118+ | HURRICANE | HURRICANE | AIR FILLED WITH FOAM; SEA COMPLETELY WHITE DRIVING SPRAY; VISIBILITY GREATLY REDUCED. | | PHENOMENAL | 9 | OVER 45 |

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WIND AND SEA SCALE FOR FULLY ARISEN SEA

| WIND AND SEA SCALE FOR FULLY ARISEN SEA | | | | | | | | | | | | | | |
|---|---|---------------------|-----------------|---------------|-----------------------|------------------|-------------|----------------------|--|--|----------------|---------------------|--------------------------------|--------------------------|
| SEA STATE | SEA - GENERAL | | WIND | | | SEA | | | | | | | | |
| | DESCRIPTION | BEAUFORT WIND FORCE | DESCRIPTION | RANGE (KNOTS) | WIND VELOCITY (KNOTS) | WAVE HEIGHT FEET | | | SIGNIFICANT RANGE OF PERIODS (SECONDS) | (PERIOD OF MAXIMUM ENERGY OF SPECTRUM) | AVERAGE PERIOD | AVERAGE WAVE LENGTH | MINIMUM FETCH (NAUTICAL MILES) | MINIMUM DURATION (HOURS) |
| | | | | | | AVERAGE | SIGNIFICANT | AVERAGE 1/10 HIGHEST | | | | | | |
| 0 | SEA LIKE A MIRROR | 0 | CALM | <1 | 0 | 0 | 0 | 0 | - | - | - | - | - | - |
| | RIPPLES WITH THE APPEARANCE OF SCALES ARE FORMED, BUT WITHOUT FOAM CRESTS. | 1 | LIGHT AIR | 1 - 3 | 2 | 0.05 | 0.08 | 0.10 | UP TO 1.2 SEC | 0.7 | 0.5 | 10 IN | 5 | 18 MIN |
| 1 | SMALL WAVELETS, STILL SHORT BUT MORE PRONOUNCED; CRESTS HAVE A GLASSY APPEARANCE, BUT DO NOT BREAK. | 2 | LIGHT BREEZE | 4 - 6 | 5 | 0.18 | 0.29 | 0.37 | 0.4 - 2.8 | 2.0 | 1.4 | 6.7 FT | 8 | 39 MIN |
| | LARGE WAVELETS, CREST BEGIN TO BREAK, FOAM OF A GLASSY APPEARANCE, PERHAPS SCATTERED WHITE HORSES. | 3 | GENTLE BREEZE | 7 - 10 | 8.5 | 0.6 | 1.0 | 1.2 | 0.8-5.0 | 3.4 | 2.4 | 20 | 9.8 | 1.7 HRS |
| 2 | SMALL WAVES BECOMING LARGER; FAIRLY FREQUENT WHITE HORSES. | 4 | MODERATE BREEZE | 11 - 16 | 10 | 0.88 | 1.4 | 1.8 | 1.0-6.0 | 4 | 2.9 | 27 | 10 | 2.4 |
| | | | | | 12 | 1.4 | 2.2 | 2.8 | 1.0-7.0 | 4.8 | 3.4 | 40 | 18 | 3.8 |
| 3 | | | | | 13.5 | 1.8 | 2.9 | 3.7 | 1.4-7.6 | 5.4 | 3.9 | 52 | 24 | 4.8 |
| | | | | | 14 | 2.0 | 3.3 | 4.2 | 1.5-7.8 | 5.8 | 4.0 | 59 | 28 | 5.2 |
| 4 | | | | | 16 | 2.9 | 4.6 | 5.8 | 2.0-8.8 | 6.5 | 4.6 | 71 | 40 | 6.6 |
| | | | | | 18 | 3.8 | 6.1 | 7.8 | 2.5-10.0 | 7.2 | 5.1 | 90 | 55 | 8.3 |
| 5 | MODERATE WAVES, TAKING A MORE PRONOUNCED LONG FORM; MANY WHITE HORSES ARE FORMED. (CHANCE OF SOME SPRAY). | 5 | FRESH BREEZE | 17 - 21 | 19 | 4.3 | 6.9 | 8.7 | 2.8-10.6 | 7.7 | 5.4 | 99 | 65 | 9.2 |
| | | | | | 20 | 5.0 | 8.0 | 10 | 3.0-11.1 | 8.1 | 5.7 | 111 | 75 | 10 |
| 6 | LARGE WAVES BEGIN TO FORM; THE WHITE FOAM CRESTS ARE MORE EXTENSIVE EVERYWHERE. (PROBABLY SOME SPRAY). | 6 | STRONG BREEZE | 22 - 27 | 22 | 6.4 | 10 | 13 | 3.4-12.2 | 8.9 | 6.3 | 134 | 100 | 12 |
| | | | | | 24 | 7.9 | 12 | 16 | 3.7-13.5 | 9.7 | 6.8 | 160 | 130 | 14 |
| 7 | SEA HEAPS UP AND WHITE FOAM FROM BREAKING WAVES BEGINS TO BE BLOWN IN STREAKS ALONG THE DIRECTION OF THE WIND. (SPINDRIFT BEGINS TO BE SEEN). | 7 | NEAR GALE | 28 - 33 | 24.5 | 8.2 | 13 | 17 | 3.8-13.6 | 9.9 | 7.0 | 164 | 140 | 15 |
| | | | | | 26 | 9.6 | 15 | 20 | 4.0-14.5 | 10.5 | 7.4 | 188 | 180 | 17 |
| 8 | MODERATELY HIGH WAVES OF GREATER LENGTH; EDGES OF CRESTS BREAK INTO SPINDRIFT. THE FOAM IS BLOWN IN WELL MARKED STREAKS ALONG THE DIRECTION OF THE WIND. SPRAY AFFECTS VISIBILITY. | 8 | FRESH GALE | 34 - 40 | 28 | 11 | 18 | 23 | 4.5-15.5 | 11.3 | 7.9 | 212 | 230 | 20 |
| | | | | | 30 | 14 | 22 | 28 | 4.7-16.7 | 12.1 | 8.6 | 250 | 280 | 23 |
| 9 | HIGH WAVES, DENSE STREAKS OF FOAM ALONG THE DIRECTION OF THE WIND. SEA BEGINS TO ROLL. VISIBILITY AFFECTED. | 9 | STRONG GALE | 41 - 47 | 30.5 | 14 | 23 | 29 | 4.8-17.0 | 12.4 | 8.7 | 258 | 290 | 24 |
| | | | | | 32 | 16 | 26 | 33 | 5.0-17.5 | 12.9 | 9.1 | 285 | 340 | 27 |
| 10 | VERY HIGH WAVES WITH LONG OVERHANGING CRESTS. THE RESULTING FOAM IS IN GREAT PATCHES AND IS BLOWN IN DENSE WHITE STREAKS ALONG THE DIRECTION OF THE WIND. ON THE WHOLE THE SURFACE OF THE SEA TAKES A WHITE APPEARANCE. THE ROLLING OF THE SEA BECOMES HEAVY AND SHOCK-LIKE. VISIBILITY IS AFFECTED. | 10 | STORM | 48 - 55 | 34 | 19 | 30 | 38 | 5.5-18.5 | 13.6 | 9.7 | 322 | 420 | 30 |
| | | | | | 36 | 21 | 35 | 44 | 5.8-19.7 | 14.5 | 10.3 | 363 | 500 | 34 |
| 11 | EXCEPTIONALLY HIGH WAVES (SMALL AND MEDIUM-SIZED SHIPS MIGHT FOR A LONG TIME BE LOST TO VIEW BEHIND THE WAVES). THE SEA IS COMPLETELY COVERED WITH LONG WHITE PATCHES OF FOAM LYING ALONG THE DIRECTION OF THE WIND. EVERYWHERE THE EDGES OF THE WAVE CRESTS ARE BLOWN INTO FROTH. VISIBILITY AFFECTED. | 11 | VIOLENT STORM | 56 - 63 | 37 | 23 | 37 | 46.7 | 6.0-20.5 | 14.9 | 10.5 | 376 | 530 | 37 |
| | | | | | 38 | 25 | 40 | 50 | 6.2-20.8 | 15.4 | 10.7 | 392 | 600 | 38 |
| 12 | AIR FILLED WITH FOAM AND SPRAY. SEA COMPLETELY WHITE WITH DRIVING SPRAY; VISIBILITY VERY SERIOUSLY AFFECTED. | 12 | HURRICANE | 64+ | 40 | 28 | 45 | 58 | 6.5-21.7 | 16.1 | 11.4 | 444 | 710 | 42 |
| | | | | | 42 | 31 | 50 | 64 | 7.0-23.0 | 17.0 | 12.0 | 492 | 830 | 47 |
| | | | | | 44 | 36 | 58 | 73 | 7.0-24.2 | 17.7 | 12.5 | 534 | 960 | 52 |
| | | | | | 46 | 40 | 64 | 81 | 7.0-25.0 | 18.6 | 13.1 | 590 | 1110 | 57 |
| | | | | | 48 | 44 | 71 | 90 | 7.5-26.0 | 19.4 | 13.8 | 650 | 1250 | 63 |
| | | | | | 50 | 49 | 78 | 99 | 7.5-27.0 | 20.2 | 14.3 | 700 | 1420 | 69 |
| | | | | | 51.5 | 52 | 83 | 106 | 8.0-28.2 | 20.8 | 14.7 | 736 | 1560 | 73 |
| | | | | | 52 | 54 | 87 | 110 | 8.0-28.5 | 21.0 | 14.8 | 750 | 1610 | 75 |
| | | | | | 54 | 59 | 95 | 121 | 8.0-29.5 | 21.8 | 15.4 | 810 | 1800 | 81 |
| | | | | | 56 | 64 | 103 | 130 | 8.5-31.0 | 22.6 | 16.3 | 910 | 2100 | 88 |
| | | | | | 59.5 | 73 | 116 | 148 | 10.0-32.0 | 24.0 | 17.0 | 965 | 2500 | 101 |
| | | | | | >64 | >80 | >128 | >164 | 101(35) | (26) | (18) | ~ | ~ | ~ |

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APPENDIX VI

REFERENCES USED TO DEVELOP THE TRAMAN

NOTE: Although the following references were current when this TRAMAN was published, their continued currency cannot be assured. When consulting these references, keep in mind that they may have been revised to reflect new technology or revised methods, practices, or procedures. You therefore need to ensure that you are studying the latest references.

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